InVeST 2015 CONFERENCE

14th – 16th September 2015
Hannover

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4. **Improve quality of life**[6]
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For more information on the ROYAL CANIN® Weight Management Programme please contact your Veterinary Business Manager.

1. German AJ et al. A high protein, high fibre diet improves weight loss in obese dogs. The Veterinary Journal 183 (2010) 294–297. **2.** Bissot T et al. Novel dietary strategies can improve the outcome of weight loss programmes in obese client-owned cats. Journal of Feline Medicine and Surgery (2010) 12, 104-112. **3.** Weber M, Bissot T, Servet E, Sergheraert R, Biourge V, and German AJ. A high protein, high fiber diet designed for weight loss improves satiety in dogs. J Vet Intern Med 2007;21:1203–1208. **4.** German AJ et al. Low-maintenance energy requirements of obese dogs after weight loss. British Journal of Nutrition (2011), 106, S93–S96. **5.** German AJ et al. Long term follow-up after weight management in obese dogs: The role of diet in preventing regain. The Veterinary Journal, May 2011. **6.** German AJ, Holden SL, Wiseman-Orr ML, Reid J, Nolan AM, Biourge V, Morris PJ, Scott EM. Quality of life is reduced in obese dogs but improves after successful weight loss. The Veterinary Journal. 2012 Jun;192 (3):428-34.

Welcome to InVeST 2015

On behalf of the organizing committee, we are delighted to welcome you to Hannover to the 4th International Veterinary Simulation in Teaching (InVeST) Conference. We hope you find the conference informative and inspiring for your work and that you enjoy your stay in Hannover.
The aim of InVeST conferences is to encourage researchers, developers and educational institutions on simulation in teaching and use of simulation in veterinary education. Focus of this year's InVeST is the development and effectiveness of simulators as well as teaching and communication skills.
This booklet contains information regarding:

- Program
- Keynote speakers
- Interactive Sessions
- Workshops
- Contact details
- List of delegates

We would like to thank our keynote speakers Sarah Baillie, Daryl Buss, Jane Shaw and Carol Gray for joining us. In addition, we would like to thank all workshop facilitators who make this conference excellent. Last but not least, we would like to thank all delegates for their contribution to this InVeST conference. Thank you to all of you for sharing your expertise and ideas to foster simulation in teaching and improving veterinary education.

Organizing Committee:
Marc Dilly, Silke Gaida & Simon Engelskirchen

A special thank you to our sponsors:

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USEFULL INFORMATION

INTERNET ACCESS

You can access wireless internet on your laptop, tablets and smartphones.

For delegates from organisations participating in the Eduroam group, you can connect to Eduroam for the fastest internet. Please use your usual username and login from your institution.

If you do not have eduroam, web and email access will be available in all areas via “TiHo-Internet” W-Lan.
It will open automatically when you have the W-Lan active and open a browser.
The temporary account details (username and password) are attached to your delegate packs (pale blue paper) - if you need help, contact the registration desk.

FOOD

During breaks we provide coffee and snacks.

Lunch and the conference dinner on Monday at the Caballus are included in the registration cost.

For Lunch we prepare sandwiches and drinks in the foyer.

CONTACT DETAILS

Please do not hesitate to contact one of the organizing committee or a steward if you have any questions; we will be happy to help you.

PROGRAM

Monday 14th September

Time	Activity		Location
10:00 – 12:30	Registration Tea and Coffee and Snacks provided		Foyer, CSL
13:00 – 13:20	**Welcome to InVeST 2015** **President of TiHo Hannover Dr.Dr.h.c. Gerhard Greif**		Lecture hall, first floor
13:20 – 13:50	**Keynote 1: How can we optimise the integration of simulation-based teaching into a veterinary curriculum?** **Sarah Baillie**		Lecture hall, first floor
14:00 – 16:00	**Workshop Session 1 90 min.**	Setting up an OSCE (Sarah Baillie & Alison Catterall)	Room Nr. 16
		Teaching Surgical Skills in Large Animals (Dean Hendrickson)	Room Nr. 12
		"Students in educational research projects" – how to turn students from consumers to creators (Renate Weller)	seminar room upstairs
		Development and Fabrication Process for Practical Simulation Model (Russ Gray & Bryan Pfahl)	Room Nr. 7
	Workshop Session 1 120 min.	Promoting effective student feedback (Sheena Warman)	Room Nr. 9
16:00 – 16:20	**Break**		Foyer, CSL
16:30 – 17:45	**Interactive Session 1**	**Skills & Simulation**	Lecture hall, first floor
	Carol Breadley	A Synthetic Abdominal Model for Teaching Basic Veterinary Surgical Techniques	Chair: Dean Hendrickson
	Stephanie Caston	Comparison of teaching small intestinal anastomosis suturing techniques using simulated small intestine versus cadaveric small intestine to second year veterinary students.	
	Tatiana Motta	Development and Validation of a Low-Cost Surgical Simulator to Teach Canine Ovariohysterectomy	
	Tatiana Motta	Development and Evaluation of a Novel Feline Endotracheal Intubation Model	
	Simon Engelskirchen	Development of a dog simulator for ultrasonic based puncture of the urinary bladder	
17:05 – 17:15	**Break**		
	Tamy Frank-Cannon	Simulators in 1st year veterinary student clinical skills course.	Chair: Robin Farrell
	Lane Anderson	Validation of a multipurpose reusable dog manikin for teaching basic diagnostic techniques	
	Johanna Sharples	Validation of a simulator for the supplementary teaching of farriery skills to veterinary students	
	Julie Williamson	Development and validation of a multi-purpose equine neck model	
	Christopher Sommer	Development of a Low Fidelity Swine Model to Teach Students Restraint, Blood Sampling and Giving Injections	
	Jennifer Schleining	The use of a life-size simulator to teach venipuncture in the alpaca	
18:00	**Dinner Caballus**		

Tuesday 15th September

Time	Activity		Location
8:00 – 9:00	Registration Tea and Coffee provided		Foyer, CSL
09:00 - 09:45	**Interactive Session 2**	**Teaching and Learning**	Lecture hall, first floor
	Tatiana Motta	Validating the Use of Low-Cost Simulation Models and Online Instructional Modules to Teach Asepsis	Chair: Sheena Warman
	Annett Annandale	Did unsupervised practice of clinical pathology procedures in a Skills Laboratory improve examination confidence and performance?	
	Sarah Baillie	vetPAL: A student led peer-assisted learning initiative	
	Rosangela Gebara	Using a video as a new tool to disseminate the best teaching alternatives to the harmful use of animals in veterinary education in Latin America.	
	Lina Müller	Analyzing the demand for video material in veterinary education	
	Dora Bernigau	Evaluation of clinical skills training in veterinary education using audio-visual instructional animations and low-fidelity models	
09:45 – 10:00	**Break**		
10:00 – 12:00	**Workshop session 2 90min**	Simulated clients: Enhance communication teaching and leraning through in the moment coaching and feedback (Elpida Artemiou & Beth Dronson)	Room 5
		The ethics of educational research (Carol Gray)	Room 16
		Skills education in the veterinary curriculum; how to assess we get value for money? (Claudia Wolschrijn)	seminar room upstairs
	Workshop Session 2 120 min.	Developing and maintaining clinical skills learning environments and student resources (Robin Farrell & Linda Shell)	Room 7
		"How to create your own virtual patient" Part 1 (Christin Kleinsorgen)	Room 9
		"Strategies and Tools for flipping Content and Encouraging Critical Thinking" (Duncan Ferguson)	Lecture hall, first floor
12:00 – 13:00	**Lunch**		**Foyer, CSL**

13:00 – 13:30	**Interactive Session 3**	**Skills & Simulation**	Lecture hall, first floor
	Márton Balogh	Using computer simulation to enhance learning in a clinical skills laboratory environment	Chair: Renate Weller
	Robert Malinowski	Best Methods for Surgical Planning with 3D Printing	
	Annett Annandale	The OPUSheep - Development of an interactive 3-dimensional sheep ultrasound examination simulator	
	Stefanie Weber	First veterinary simulator for the abdominal sonography of the cat – with focus on kidneys	
	Elisabeth Zandt	The world's first simulator for echocardiographic examinations in cats	
13:45 – 15:45	**Workshop Session 3 90 min.**	Clinical Skills Model Buffett and Tours to the Clinical Skills Lab (Rikke Langenbæk & Marc Dilly)	Room 12
	Workshop Session 3 120 min.	Introduction to Games Based Learning, The Layered Learning Model and Game Development (Eric Bauman & Dave Pederson)	Lecture hall, first floor
		Optimising Small Group Teaching (Catriona Bell)	Room 16
		Creating a simulation case under aspects of realism and cost (Katja Anne Dannenberg & Fabian Stroben)	seminar room upstairs
		"How to create your own virtual patient" Part 2 (Christin Kleinsorgen)	Room 9
		"Cultivating a Growth Mindset: Enhancing Receptivity to Feedback" (Jane Shaw)	Room 7
16:00 – 16:30	**Keynote 2: Internationalization of veterinary education** **Daryl Buss**		Lecture hall, first floor
16:30 – 17:15	**Interactive Session 4**	**E-learning**	
	Florian Spiegel	Case-based e-learning model "CASUS" "Health management in pig farms" as a complement tool in the practical veterinary education and advanced training	Chair: Márton Balogh
	Nicole Marquardt	Conceptual design and realisation of the e-learning of the berliner kompaktkurse – evaluation of user satisfaction via online survey	
	Jennifer Roberts	The iVetSchool Application: A Multimedia Approach to Supplementing Veterinary Medical Student Education Through Problem Based Learning	
	Dora Bernigau	Development and evaluation of two anatomical po"t"casts for students learning the anatomy of the tongue	
	Stuart Barber	Development of 4D virtual farms	
	Sarah Baillie	The Global Resource for Online Evidence-Based Veterinary Medicine Learning	
17:15 – 18:00	**Showroom for Model and Simulator presentation**		
19:00	**Dinner Meyers Lebenslust**		

Wednesday 16th September

Time	Activity		Location
8:00 – 9:00	Registration Tea and Coffee provided		Foyer, CSL
09:15 – 09:45	**Interactive Session 5**	**Communication**	Lecture hall, first floor
	Caroline Ritter	Assessment of communication patterns of Canadian dairy practitioners during farm visits	Chair: Elpida Artemiou
	Jane Shaw	Onsite Communication Skills Education and Outcomes Assessment in a Companion Animal Practice	
	Claire Vinten	Using standardised client simulation to improve clinical reasoning in veterinary undergraduates	
	Catriona Bell	Preparing veterinary students for clinical placements by embedding simulation and clinical scenarios into small group clinical skills teaching.	
09:45 – 10:15	**Keynote 3: Building a Communication Curriculum: One block at a time** **Jane Shaw**		Lecture hall, first floor
10:15 – 10:30	**Break**		
10:30 – 11:00	**Keynote 4: NUVACS – the communication skills collective 2002-2015** **Carol Gray**		Lecture hall, first floor
11:00 – 11:30	**Interactive Session 6**	**Skills and Simulation**	Lecture hall, first floor
	Annett Annandale	Development of a low cost cow dystocia model	Chair: Duncan Ferguson
	Laura Schüller	Construction and implementation of a bovine obstetrical model as an interactive teaching method for veterinary students	
	Hannah Giese	Validation of a Bovine Vascular Access Model for Teaching Students a Technique for Placing Catheter in the Auricular Vein of Cattle	
	Annett Annandale	A sheath scrape model attached to a multifunctional life size Breeding Soundness Examination (BSE) bull	
11:30 – 11:45	**Break**		
11:45 – 12:15	**Interactive Session 7**	**Skills and Simulation**	Lecture hall, first floor
	Tatiana Motta	Can Virtual Reality Enhance Academic Success while Learning About the Canine Stifle Joint?	Chair: Carol Gray
	Inga Wölfel	A new approach in anatomical teaching - Upgrading the conventional practical learning by immediate combination with modern digital teaching	
	Patricia Schrock	Virtual 3D Veterinary Anatomy: Interactive Learning Modules	
	Julia Matera	Student's perception about harmful use of animals in Veterinary Education in Brazil	
	Julianna Thuróczy	Meeting point of animal welfare and veterinary education or else. The difficulties of the clinician in the ocean of students and animals.	
12:15 – 12:30	**Closing remarks – Marc Dilly**		
12:30 – 13:30	**Lunch**		
14:00	**Guided tours to the– Clinic for Cattle, Clinic for Swine, Small Ruminants and Forensic Medicine, Clinic for Horses, Clinic for Small Animals** **Excursion to the state stad farm Celle** **Guided city tour Hannover**		

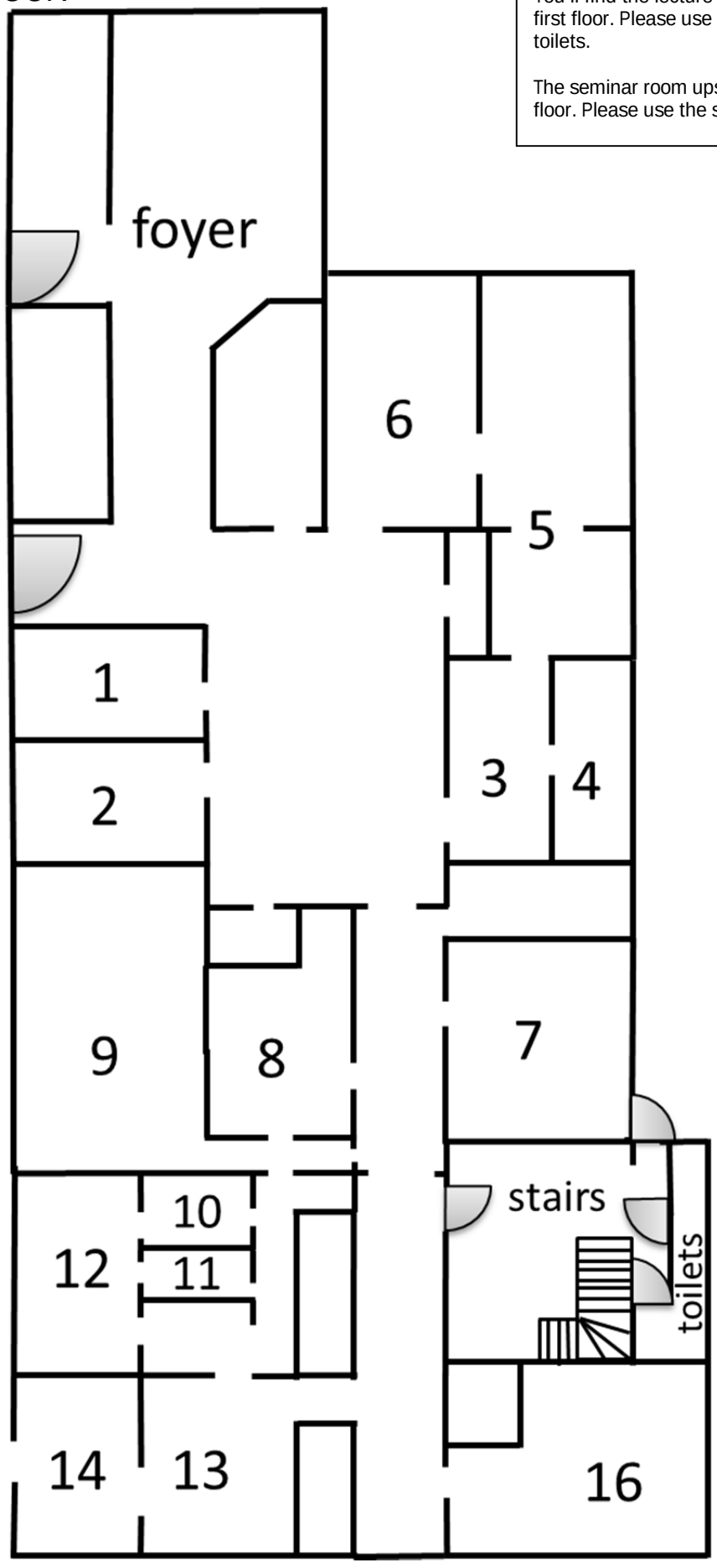
AREA MAP

You'll find the registration desk in the foyer.

You'll find the lecture hall upstairs on the first floor. Please use the stairs near the toilets.

The seminar room upstairs is on the second floor. Please use the same stairs.

MAIN FLOOR



KEYNOTES:

1. How can we optimise the integration of simulation-based teaching into a veterinary curriculum?

(Sarah Baillie)
Simulation-based teaching, which includes the wide range of models now available in clinical skills laboratories, is increasingly adopted by veterinary educators. However, to maximise the benefits to student learning and animal welfare it is crucial that integration into the curriculum is comprehensive, carefully managed and innovative. An overview of curriculum integration will be presented as well as some tips for success and examples of simulation-based teaching and assessment at different levels.

2. Internationalization of veterinary education

(Daryl Buss)
Simulations and model Simulations and models designed to aid learning and teaching in veterinary medical education are not new concepts. However, simulation, teaching models, and other innovations have blossomed in recent years, in part due to an increased emphasis on promoting Day 1 skills of the graduating veterinarian. That emphasis has been a response to feedback from the profession of veterinary medicine around the world, but it has also become a requirement of many accreditors of veterinary medical educational programs, including the Council on Education (CoE) of the American Veterinary Medical Education. The number of schools and colleges of veterinary medicine accredited by the CoE has increased, paralleled by an increasingly international composition of membership in the Association of American Veterinary Medical Colleges (AAVMC). That internationalization, combined with many other factors, has resulted in greater communication among veterinary medical educators. This meeting is an excellent example of that international collaboration and the sharing of information. The AAVMC's Journal of Veterinary Medical Education (JVME) is proud of its role in sharing and promoting innovation and discovery in veterinary medical education. Simulation systems, along with teaching & learning aids in general, have grown in sophistication and effectiveness over the years. Consequently, the role of the JVME and meetings such as InVeSt have become ever more important as they move beyond the level of describing new innovations in simulation and modelling to an increasing focus on critical testing of their effectiveness, compared to one another as well as compared to traditional learning and teaching systems. This is an exciting time in veterinary medical education as we continue to see ever more creative and novel teaching and learning aids, accompanied by critical outcomes analyses. However, there is much more to be done. For example, student learning includes many areas, beyond clinical instruction and clinical skills, that would greatly benefit by high quality simulation and modelling. Due to the intense focus on the manipulative skills that tend to be the primary focus of Day 1 skills, however, the creation and refinement of simulations and models that facilitate conceptual understanding of important basis science principles has been relatively underserved. We are charged with educating veterinarians as health care professionals in an age of One Health. If we are to meet that obligation, we must balance the need of our graduates for manipulative and diagnostic skills with the sound bases in science and biology that are expected of a modern health care professional. Novel, effective simulation and models have an important role to play in that educational process, and I look forward to a continuum of such learning aides that will span the entire veterinary medicine educational program.s designed to aid learning and teaching in veterinary medical education are not new concepts. However, simulation, teaching models, and other innovations have blossomed in recent years, in part due to an increased emphasis on promoting Day 1 skills of the graduating veterinarian. That emphasis has been a response to feedback from the profession of veterinary medicine around the world, but it has also become a requirement of many accreditors of veterinary medical educational programs, including the Council on Education (CoE) of the American Veterinary Medical Education. 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3. Building a Communication Curriculum: One block at a time

(Jane Shaw)

The driving goal of the Colorado State University Communication Curriculum is to graduate career-ready veterinarians with "day-one skills" to serve and work with diverse clients, animals and team members. In order to meet this goal, the curriculum design is based on:

Adult Learning Principles

Applying adult learning theory has been instrumental to teaching professional students, who are already accomplished when they enter the program. Problem-based learning creates an active and relevant learning environment for generation Y students. We strive to engage students, create an active learner-centered environment, elicit students' perspectives, and capitalize on students' pre-existing knowledge and experiences as a foundation on which to build new skills.

Active Learning

The in-classroom communication modules are consciously designed with 1/3 focus on presentation of content and 2/3 time spent conducting exercises using video demonstration, small group discussion, clinician case presentations and/or role-playing. In junior practicum we flip the classroom, requiring students to complete pre-reading and take a quiz on the skills, so that they come into class with a base knowledge level. We then optimize the classroom time by practicing and applying the skills to prepare for the simulated client laboratory.

Experiential Learning

We utilize experiential learning techniques in the communication laboratory, which creates an opportunity for students to interact with simulated clients, practice their clinical interviewing skills, receive feedback from their peers, client and coach, and reflect on their communication through watching a videotape of their performance. Although challenging, stretching students beyond their comfort zone by interacting with simulated clients in a safe and supportive environment reveals powerful lessons often from the client's viewpoint.

Theoretical and Evidence-Based

The communication courses are skills-based and theoretically pinned to the educational framework of the Calgary-Cambridge Guide. The focus is on both zkdwskills can be used each phase of the clinical interview and krz to apply these skills in the clinical setting with clients. This approach creates a strong communication toolbox that can be carried to each consultation, implemented in diverse situations and adapted to individual style.

Integration throughout the Curriculum

An effective communication curriculum incorporates opportunities to practice skills throughout all 4 years of the program. In addition to building skills over time and increasing the level of difficulty, integration of communication skills training throughout the curriculum enables reiteration of concepts and enhances learning, long-term memory and overall retention.

4. NUVACS – the communication skills collective 2002-2015

(Carol Gray)

The National Unit for the Advancement of Veterinary Communication Skills was set up in the United Kingdom in 2002. Its aim: to ensure that communication skills were included in every veterinary school's curriculum, with a shared approach to teaching and assessment. At the time of its inception, there were 7 veterinary schools in the United Kingdom and Ireland. All sent representatives to NUVACS meetings and provided training for staff in facilitation techniques. Since the beginning, two new schools have joined the venture. A measure of the collective's success is the fact that in the present day, nobody asks *whether* we should include communication skills in our veterinary teaching; instead, they ask: "*How* should we teach this subject?"

A core communications curriculum has been developed, and shared resources such as communication scenarios and OSCE stations, together with DVDs for teaching and training examiners and students, are available to all.

This talk will look at the history of what was considered to be one of the first successful collaborations involving all of the UK and Irish veterinary schools, taking it up to the present day and perhaps looking ahead to where it can go in the future. It will also share the pitfalls and successes of such a collaborative venture.

TOPIC: SKILLS + SIMULATION 1

01

A synthetic abdominal model for teaching basic veterinary surgical techniques

Carol Bradley[1], Glenn Edwards[2], A. Carlson[1]

[1]University of Melbourne, Faculty of Veterinary & Agricultural Sciences, Melbourne, Australia
[2]Charles Sturt University, Wagga Wagga, Australia

As with most veterinary schools within Australia, the authors were questioning the ethical validity and cadaver sustainability, together with the increasing financial burden to veterinary faculties on the continued use of fresh cadaveric tissue in the introduction of basic surgical techniques (Day 1 skills) to our DVM3 cohort.

This project looked at the specific outcomes required for basic day one surgical competency. The outcomes identified included aseptic technique, preparation of oneself and the patient, surgical draping, instrument handling, completion of a surgical incision through to the abdominal cavity and surgical closure of the abdominal incision, using a three layer technique.

Once outcomes were identified, the authors looked at traditional teaching methods on fresh cadaveric tissue or cadaver's and considered whether a synthetic model could replace some of the practical classes that traditionally used fresh cadavers and if so, could it give an equal or reasonable learning experience to the novice surgeon.

Therefore the aim of the project was to develop a cost effect synthetic model, replicating the visual and tactility of a midline abdominal incision and closure, representative of a canine patient with the potential for placement of cadaveric material within its boundaries.

A suture training model (Figure 1) constructed of a commercially available polyurethane foam wound dressing (Allevyn) was identified as being an ideal dermis and epidermis layer with the added value of having an outer water-proof layer which would allow students to practice patient preparation technique.

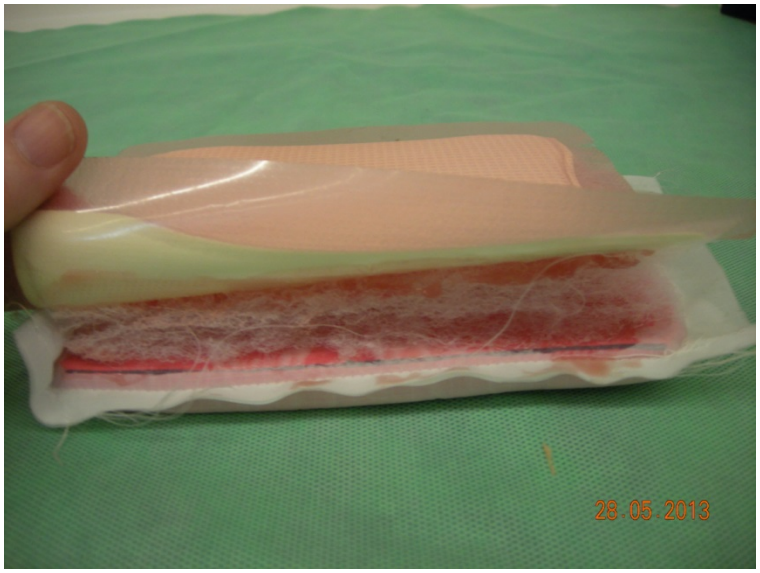

Figure 1

A variety of synthetic materials were tested for visual representation, texture and robustness for each subsequent layer required.

A loosely woven material resembling fat and interspersed with red silicone was selected for the subcutaneous tissue; then using varying amounts of the material we enabled changes to its thickness and number of linea blood vessels.

The body wall is composed of two pieces of dense foam "rectus muscles" enclosed in rip-proof nylon material to replicate the internal and external rectus sheaths with a small gap in between the foam pieces to imitate the linea alba. This entire piece was loosely glued to the "skin" layer.

The addition of a chinese food container beneath the model created an abdominal cavity that could hold cadaveric tissue and then integrated into a soft toy mannequin.

The model consists of a variety of synthetic materials selected on the basis of physical characteristics and suture pull-out strength, to replicate the handling and mechanical properties of the skin, subcutaneous tissues, and body wall, including the linea alba, internal and external rectus sheaths and rectus abdominus muscles.

The use of the model has been evaluated by students during practical classes in parallel with traditional cadaveric materials, and has been widely accepted as a model which can provide an opportunity to practice basic surgical techniques both within and outside the surgical teaching environment in a cost-effective manner.

This model has been shown to provide an acceptable alternative to cadaveric animal tissues in an integrated teaching program enabling the students to develop basic surgical techniques, thus reducing the number of animal required in the surgical teaching laboratory. The use of this model allows for early exposure to skills training ensuring that basic skills are mastered prior to exposure to valuable animal tissues and then live animals in neutering clinics and clinical practice.

The model is of additional value within the Clinical Skills Centre where students are self-directed and peer reviewed in their learning prior to the clinical skills hurdle exam in DVM3.

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Freely available from: http://www.egms.de/en/meetings/invest2015/15invest01.shtml

02

Comparison of teaching small intestinal anastomosis suturing techniques using simulated small intestine versus cadaveric small intestine to second year veterinary students

Stephanie S. Caston[1], Jennifer A. Schleining[2], Jared A. Danielson[3], Eric L. Reinertson[1], Kevin D. Kersh[1]

[1]Departments of Veterinary Clinical Sciences, Iowa State University, Ames, Iowa, United States
[2]Veterinary Diagnostic and Production Animal Medicine, Iowa State University, Ames, Iowa, United States
[3]Veterinary Pathology, Iowa State University, Ames, Iowa, United States

Yearly surveys of practices employing Iowa State University College of Veterinary Medicine graduates consistently rate proficiency in clinical skills as “very important” when practices are considering hiring a new associate; second only to communication skills. However, the cost of providing certain clinical skills training on live animals or tissues from live animals in the professional curriculum is becoming prohibitive. Teaching appropriate suture patterns on simulated tissue could allow students to be better prepared for the live animal experience, have more confidence when first presented with live animal surgery, and possibly reduce the number of live animals needed for the student to gain proficiency in intestinal suture placement [1]. This could directly reduce the cost of teaching surgical skills in the veterinary program as well as reduce the number of terminal animals that are currently utilized to provide learning specimens for surgical skills laboratories.

It is hypothesized that students who are trained on simulated small intestine to correctly place a Gambee suture pattern will perform as well as students who are trained in the traditional method of Gambee suture placement using cadaveric small intestine.

A random subset of veterinary students in the second year of the professional curriculum at Iowa State University College of Veterinary Medicine who are enrolled in the second year course Principles of Surgery Laboratory will be identified to participate in this study. Students may opt out of the study at any time. As part of a regularly scheduled laboratory introducing the surgical procedure of small intestinal anastomosis students will be divided into two groups: 1. Anastamosis utilizing simulated small intestine[a] and 2. Anastamosis utilizing the current protocol of cadaveric small intestinal tissue harvested from euthanized horses. An instructor (ELR) will demonstrate how to perform intestinal anastomosis utilizing visual training aids and verbal communication. Each student will then be released to surgery tables supplied with the appropriate small intestinal segment where they will practice the Gambee pattern to complete intestinal anastomosis while the same instructor (ELR) provides supervision of technique. Gambee pattern placement will then be assessed by blinded investigators (JAS, KDK, and SSC) in the subsequent surgery laboratory one week later utilizing a rubric developed and validated for surgical skills assessment.

Three blinded investigators, who are board-certified in surgery, will provide assessment of each student using the following criteria (Modified Global Rating Index for Technical Skills (GRITS) from [2]):

- Respect for Tissue – Measures appropriate use of tissue handling
- Time and Motion – Measures efficiency of suture placement and appropriate motion of instrumentation
- Instrument Handling/Knowledge – Measures appropriate use of surgical instruments
- Flow of Operation – Measures progression of the anastomosis procedure
- Knowledge of Specific Procedure – Measures procedural components of small intestinal anastomosis

Inter rater reliability will be calculated using an intra-class correlation. Descriptive statistics (mean, median, standard deviation, minimum, and maximum) will be calculated for each group. Scores between groups will be compared using a Mann-Witney U test, with $p < .05$ used for significance testing. Analyses will be performed using IBM SPSS Version 21.

[This study will be completed by April 8, 2015 and data analysis will be completed by mid-May 2015.]

[a Small Intestine Simulator, SurgiReal Products, Inc., Fort Collins, CO]

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2. Doyle JD, Webber EM, Sidhu RS. A universal global rating scale for the evaluation of technical skills in the operating room. Am J Surg. 2007 May;193(5):551-5.

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Freely available from: http://www.egms.de/en/meetings/invest2015/15invest02.shtml

03

Development and validation of a low-cost surgical simulator to teach canine ovariohysterectomy

Tatiana Motta, Benjamin Carter, Catrina Silveira, Lawrence Hill, Mary McLoughlin

Ohio State University, Columbus, United States

Basic surgical skill has been shown to be considered the most important area of knowledge in new graduates by over half of veterinarians. At The Ohio State University College of Veterinary Medicine, the curriculum of the first two years is based predominantly in lecture and supplemental material with minimal hands-on experience. As a result, third year students often lack surgical skill and experience high levels of anxiety when entering operative procedure labs. In this study, we aim to test the hypothesis that the utilization of low cost surgical simulation models can help to improve the performance and confidence of students, while decreasing students' perception of stress and anxiety.

To investigate this, a low-cost surgical simulator for canine ovariohysterectomy was created. This model allows students to practice surgical skills including approach and incision, identification of relevant anatomic structures, three clamp technique, disruption of the suspensory ligament, pedicle and uterine body ligation, and closure. The model base is reusable and contains representations for the body cavity, kidneys, descending colon, bladder, and ureters. The replaceable reproductive tract for the model includes representations for the vagina, cervix, uterine body, uterine horn, patent uterine artery, ovary, ovarian pedicle, suspensory ligament and mesometrium. Twenty-four students volunteered to participate, all of whom attended a lecture and had unlimited access to supplemental materials and videos online. Half of the students were chosen at random to also receive a low cost simulator, surgical instruments, and sufficient suture material to practice the procedure up to 5 times. The study culminated for the student volunteers by performing the surgical procedure on a cadaver.

Surgical performance of each student was graded by faculty members using recorded videos and a rubric created specifically for this study. A quiz and questionnaire was also completed by the participants to evaluate the students' knowledge, performance, comfort level, and perceived model efficacy.

No significant difference was found for the quiz scores of students trained with the simulator compared to the control group. Students in the control group spent the most time watching the videos. Students with the simulator spent 52% of their total studying time using the model. Instructional video and use of the surgical simulator were considered to be the most helpful teaching aid by 100% and 89% of the students, respectively (Figure 1). All students agreed that using the simulator increased their confidence, and most students agreed that their performance was improved and their stress level was decreased (Figure 2). Data analysis is ongoing. We expect to find that students who utilized the surgical simulator will display higher levels of surgical skill compared to students in the control group.

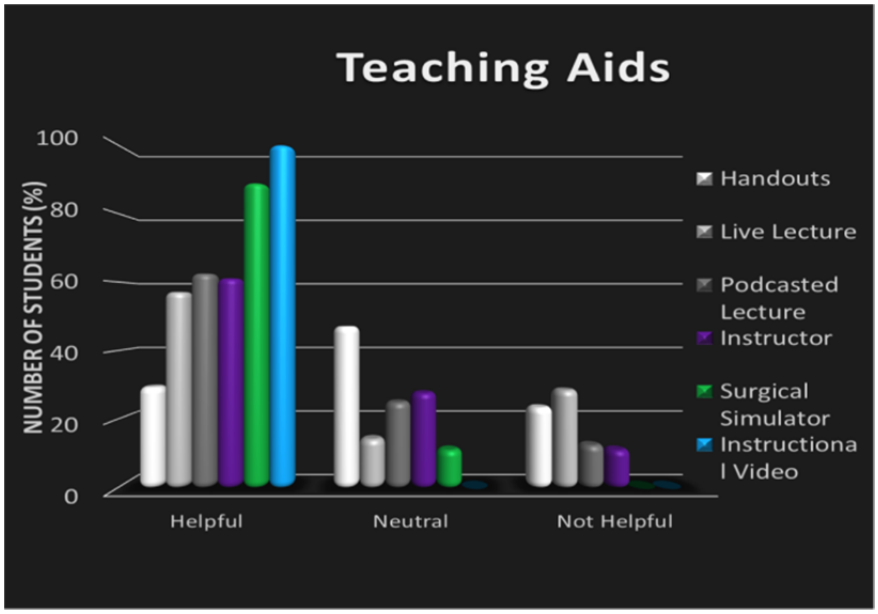

Figure 1: Teaching aids

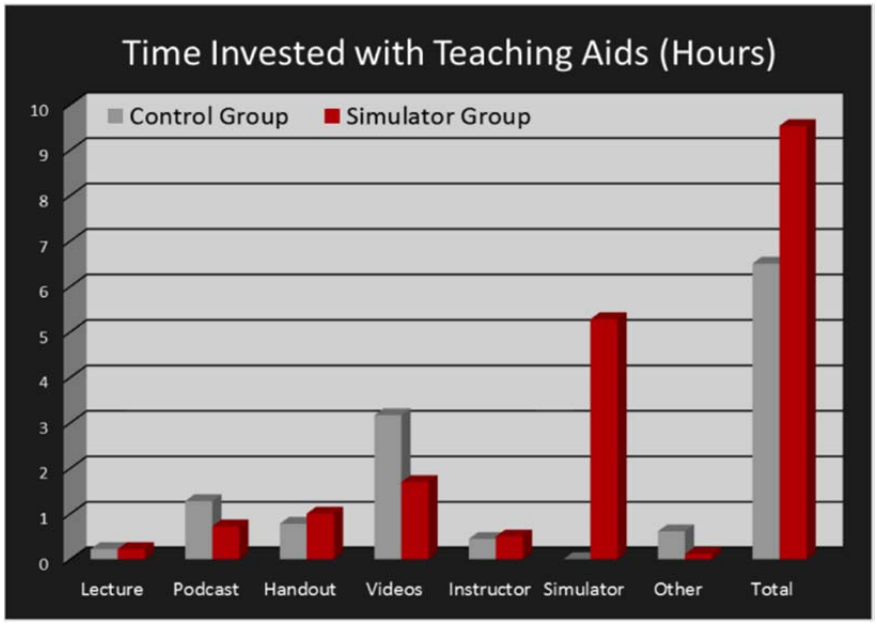

Figure 2: Time invested with teaching aids

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04

Development and evaluation of a novel feline endotracheal intubation model

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Intubation of the veterinary patient is a critical step in airway management during anesthesia as well as in emergency care. It requires ability to manipulate multiple tools at once in a limited spatial area with limited time. Feline patients have the added complication of a narrow, easily damaged glottis and overly sensitive larynx. Excessive manipulation of the larynx can induce laryngospasm making intubation more difficult. It is important for veterinary students in training to be comfortable and proficient when intubating felines to avoid damage to the respiratory tract and potentially save lives in emergency situations.

The objectives of this study were to: (1) create an intubation model specific to felines; (2) validate the model's efficacy in training 4th year veterinary students; (3) evaluate student's perception regarding the use of this model as a training aid.

Thirty senior students undergoing shelter surgery rotation were randomly assigned to the control or model group. Students in the control group performed routine feline intubation during their rotation. Students in the model group had access to an instructional video and the feline intubation model. These students were allowed to use the model to practice as many times as wanted prior to a routine live feline intubation.

Student's success rate and time to complete task were recorded during live intubation throughout the 2-week rotation. Students in both groups answered a questionnaire to assess individual's prior experience and confidence level with feline intubation. Students in the model group also answered questions rating the perceived efficacy of the feline intubation simulation model. Data collection and interpretation is ongoing. We expect to find a significant difference in student's success rate, time of task and confidence levels for individuals the model group compared to the control group.

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05

Development of a dog simulator for ultrasonic based puncture of the urinary bladder

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For significant urine analysis the sample has to be devoid of contamination. Ultrasonic based puncture of the urinary bladder (cystocentesis) is a standardised procedure to collect such a sample [1]. Relocation of bacteria from the lower urinary tract into the bladder as found after catheter placement can be avoided [2]. The opportunities to practice cystocentesis are limited during study. To improve training of this skill a simple urinary bladder simulator for “cystocentesis” was created at the Clinical Skills Lab of the University of Veterinary Medicine Hannover. The intention was to create a cost effective simulator to train and assess students sample collection of urine under ultrasonic control.

A stuffed toy dog (IKEA) was used as the external cover of the simulator (Figure 1). The abdomen is represented by a compact multilayer silicon package. Inside the silicon package a fluid filled cavity simulates the “urinary bladder”. Using an attached drip infusion set (e.g. NaCl-solution) the cavity can be refilled. In contrast to a real abdomen the simulator shows no other abdominal structures than the “bladder”. During the last year of study, students participating in ultrasound examinations at a traineeship in the clinic for small animals. At the end of the traineeship students have to perform ultrasonic based “cystocentesis” in an objective structured clinical examination (OSCE) on the simulator. At the OSCE station binary checklists (yes/no) and an ultrasound device (M5Vet, Mindray) with ultrasound probe (5-8 MHz) were used.

Figure 1 stuffed toy dog (IKEA) with simulated urinary bladder

Results of the OSCE station “cystocentesis” showed 80% (n=68) of the students passed this OSCE station. 82% could display the needle during puncture and about 74% of students successfully punctured the bladder and collected a sample. 25% were not able to demonstrate the “urinary bladder”. Almost no one modified the frequency (to 8 MHz) on the ultrasonic device to adjust the depiction. The simulators production takes about four hours, including the sewing of the stuffed dog and manufacturing the silicon package. The costs of material are approximately 50 .

Students get immediate feedback for the performance of a “cystocentesis” under ultrasound control. The simulator can be easily produced on low-cost level. Due to the use of a stuffed toy dog, one limitation of the simulator is the correct

anatomical location of the target region. Therefore, some students were confused about the correlation of the “urinary bladder” to other anatomic landmarks of the simulator. In the future this simulator will be improved and evaluated by medical specialists for diagnostic imaging and other clinicians.

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06

Simulators in 1st year veterinary student clinical skills course

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Clinical Correlates in the 1st year of the DVM program at Texas A&M University introduces the veterinary student to clinical problem solving and aims to teach basic clinical skills such as history taking, physical exam and basic technical skills such as handling and administering medications, venipuncture & intravenous catheter placement, and instrument handling. In recent years simulators have be added to the course to give the students a hands on opportunity to learn practice these skills. Silicone based subcutaneous injection model that allows for tenting of skin have been developed as well as models that provide a resistance to injection similar to muscle tissue for intramuscular injections. These models are used to teach syringe and needle handling as well as introducing the student to giving subcutaneous and intramuscular injections. Intravenous models for the canine cephalic vein and equine jugular vein are used to teach venipuncture and IV catheter placement. In spring 2015 a canine saphenous vein model was also developed and introduced to the course. A variety of suture models, both silicone based and fabric based are made in house and used to teach students basic instrument handling with a particular focus on forceps and ringed instruments as the students learn and practice simple interrupted and simple continuous suture patterns. The most recent simulator addition to the course has been a feline neuter model to teach and allow repeated practice of hand and instrument based hemostatic knot techniques.

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07

Validation of a multipurpose reusable dog manikin for teaching basic diagnostic techniques

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Many veterinary schools teach basic diagnostic skills using live dogs. The purpose of this study was to validate a multi-purpose manikin for teaching lymph node aspiration (FNA), venipuncture, cephalic venous catheterization, and cystocentesis.

Manikins with replaceable lymph nodes, venous systems and urinary bladders were developed. Undergraduate students were prospectively enrolled and stratified by veterinary experience prior to randomization to two groups (live animal or manikin). Groups were trained in FNA, cephalic and jugular venipuncture, intravenous catheterization, and cystocentesis over 5 weeks. Training included a written description of the technique, a training video, and a hands-on laboratory. The next week, participants were scored on performance of the previous week’s skill on a live animal using a standardized rubric by reviewers blinded to group. Six weeks later, assessment was repeated for all skills. Scores were compared between groups and timepoints by repeated-measures ANOVA. $P<0.05$ was significant. Table 1

Twenty-six subjects were enrolled. There were no significant differences in scores for any of the skills between the groups immediately following or 6 weeks after training (see table for median scores).

Initial proficiency and short-term retention of clinical skills do not differ for students trained using a manikin versus a live dog. Therefore manikins are a viable training method to decrease animal use.

	FNA		Cephalic venipuncture		Jugular venipuncture		Intravenous catheterization		Cystocentesis	
	Initial	Repeat	Initial	Repeat	Initial	Repeat	Initial	Repeat	Initial	Repeat
Live animal	9/9	8/9	9/9	8/9	9/9	7/9	12.5/14	11/14	8/8	6/8
Manikin	8/9	8/9	8/9	9/9	8/9	7/9	13/14	13/14	7/8	6/8

Table 1

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08

Validation of a simulator for the supplementary teaching of farriery skills to veterinary students

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Veterinary graduates in the United Kingdom are required to be competent in a number of day one skills, according to the Royal College of Veterinary Surgeons (RCVS). Students must develop these skills during intra or extra mural rotations or in university clinical skills centres. However, due to multiple reasons these opportunities can prove limited.

The aim of this project was to develop and validate a multi-purpose equine foot simulator. The simulator will provide a safe and realistic environment for undergraduate veterinary students to practice day one skills involving the equine foot. It was developed by modifying a commercially available hinged-leg model named the “Blacksmith Buddy” (Champagne Horseshoe Company, Arcadia, United States of America). Students could thereby use the simulator for practicing: the use of hoof testers, shoe removal, paring and rasping the hoof and hoof bandaging. Instructional sheets were designed to accompany the simulator, and the availability of the simulator in the Clinical Skills Centre (CSC), was advertised to clinical students via mass e-mail.

To validate the simulator as an effective teaching aid, its effect on student’s competency to use hoof testers and student’s opinion of the simulator was determined. 246 fourth year Royal Veterinary College (RVC) students were examined on using hoof testers, during their formative Objective Structured Practical Veterinary Examinations (OSPVE). Results were compared between students who had used the simulator and those who had not. An online questionnaire was then sent out, asking students about their previous experience, their experience of the OSPVE and their opinions of the simulator, if they had previously used it.

Overall, 58.9% of students passed this OSPVE station. 15% had used the simulator prior to the examination, 85% had not used the simulator. There was not a statistically significant difference in OSPVE results between the two groups ($p=0.53$). There was a significant relationship between the hoof tester OSPVE results and students wanting to go into equine practice ($p=0.02$), being confident performing the OSPVE ($p=0.02$), and wanting more opportunities to practice ($p=0.04$). Additionally, students who had used the simulator were more likely to assess their skills for using hoof testers as adequate ($p=0.03$).

The study concludes that use of the simulator improved students’ self-assessment of their skills for using hoof testers and that students who were confident in their skills were more likely to pass the hoof tester OSPVE.

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09

Development and validation of a multi-purpose equine neck model

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Simulation allows a low-stakes, humane alternative to practicing clinical skills on live animals. Models facilitate deliberate practice and mastery learning which require students to reach a pre-determined level of competence. Veterinary educators are challenged because only a few commercially models are available for teaching medical and surgical skills in the horse. Models created in-house are an alternative to commercial models and may offer the advantage to be smaller, cheaper, and allow training of a larger number of skills. This poster follows the development of a novel equine neck model that allows students to practice medical tasks such as phlebotomy and intravenous, intramuscular, and subcutaneous injections as well as surgical tasks such as making and suturing skin incisions. Validation testing for phlebotomy and intramuscular (IM) injection was performed by randomly assigning students to one of two educational intervention groups. Both groups viewed a 30-minute multimedia presentation on large animal phlebotomy and injections. Immediately following this presentation, group A participated in a structured, 90-minute laboratory session utilizing the equine neck model (Figure 1) to perform phlebotomy and IM injections while group B simultaneously participated in an identical laboratory session that used equine cadaver necks on which the jugular vein had been filled with artificial blood (Figure 2). One week later students were videotaped performing phlebotomy and IM injection on live horses. Videotapes were reviewed by an expert who was blinded to student identity and group participation. The students' performance was scored based on the completion of different steps required for each procedure and on their overall ability to complete the procedure. Student performance was compared between the 2 groups and also by taking into account previous experience. In addition, the model was assessed by a group of veterinarians for features including realism, presence of landmarks, and tactile features of the model. The equine neck model shows promise for training veterinary students, and small modifications to the model are planned according to study results.

Figure 1: Equine neck model 1

Figure 2: Equine neck model 2

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10

Development of a low fidelity swine model to teach students restraint, blood sampling and giving injections

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The model was developed within a student research project to provide an opportunity for students to practice restraining pigs with a snare, taking blood samples out of the jugular vein and giving injections into the neck muscle.

For this purpose we obtained a two piece plaster imprint of the head, neck and parts of the forelegs of pig's cadaver and subsequently casted it with silicone. A plastic hose was used to simulate the jugular vein. To imitate the blood flow colored water was filled into an infusion bottle that was connected to the "jugular vein". A closed system was created by attaching an elastic balloon to the other end of the tube, which also served to pump the "blood" back into the infusion bottle.

The injection site was padded with a piece of foam rubber on the inner surface of the swine model. Different types of foam rubber were tested to find the one that imitated the resistance of the tissue during injection best. The use of the foam rubber also provided an easy possibility to renew the material of the injection site when damaged.

The "snare" model was built up separately. Two real canine teeth were installed in the upper jaw of the silicone pig's head. The learning objective in this model was to place the snare correctly behind the teeth.

Disadvantages of our first models were a rough surface, the rigidity of the plastic hose and the fact that the plaster shape could only be used once.

In our second model we took a two-piece plaster imprint again and then used a pan to get a plaster mould and covered it with acrylic lacquer to obtain a mould that could be used several times. A silicone hose was used for the jugular vein.

To simulate a real-life situation, we are planning to implement two more features: The model will be installed on a mobile board, so that it can be moved by an assistant and has to be caught by the student first. As a next step we are planning to integrate a sound system into the model so that different volume levels of a pig that is restrained can be reproduced. Hereby we can create four levels of difficulty: neither sound nor moving, one of them or both.

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11

The use of a life-size simulator to teach venipuncture in the alpaca

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Anatomic differences in camelids increases the likelihood of accidental carotid artery puncture, which can lead to complications producing seizures or even death. Because of this, practitioners not properly trained in venipuncture techniques in camelids are often apprehensive with this clinical skill. The purpose of this study was to assess the use of a life-size alpaca simulator [Alpaca Venipuncture Model, Alternavitae, LLC, Columbus, Ohio] on the ability to perform venipuncture in the live animal. We hypothesized that students who were trained on an alpaca simulator to correctly identify appropriate landmarks and perform venipuncture would perform better than students who were trained with a PowerPoint presentation showing the same information. Veterinary students enrolled in small ruminant lab courses at Iowa State University were randomly assigned to either a simulator laboratory for venipuncture in alpacas or a PowerPoint module. Prior to instruction students completed a questionnaire relating to attitudes about venipuncture in camelids. Following instruction, students performed venipuncture on live animals, objective venipuncture data was obtained, and a follow up questionnaire was completed. Seventy one (n=71) students have completed the study to date. Students trained on the alpaca simulator considered their instructional method to be both more helpful (p 0.001) and more real ($p<0.0005$). Students trained via PowerPoint obtained blood with fewer attempts (1.4 versus 2.1; $p=0.026$). Other objective measures were not significantly different between the groups. In summary, training on an alpaca venipuncture simulation model prior to performing venipuncture in the live animal provided professional veterinary students with an increased level of confidence, but did not improve performance with a live animal. Based on this data, this ongoing study was modified to include a third group with instruction utilizing both the simulator and PowerPoint module. Data utilizing the third group is not collated at the time of abstract submission, but will be presented at the symposium.

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TOPIC: TEACHING AND LEARNING

12

Validating the use of low-cost simulation models and online instructional modules to teach asepsis

Tatiana Motta, Catrina Silveira, Benjamin Carter, Mary McLoughlin

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Surgery site infections (SSIs) account for up to 18% of all small animal surgery complications. In order to minimize microbial contamination, several aseptic techniques have been developed. Although asepsis is essential in preventing SSIs, most students still struggle with mastering aseptic technique. The goals of this study were: (1) to develop a low-cost asepsis simulation model; (2) to develop detailed asepsis instructional modules; (3) to validate the newly developed teaching tool through student performance. We hypothesized that the use of low-cost simulators associated with instructional modules will improve students' proficiency in asepsis.

An asepsis simulation model was created. Each model included: sterile gloves, surgery gown, scrub brush, skin simulator, draping materials, and surgical site preparation solutions. Instructional video modules demonstrating each of the aseptic techniques were created. The modules included: open gloving, sterile patient preparation, aseptic hand scrubbing, gowning, closed gloving, and patient draping. Thirty volunteers were randomly assigned into 2 groups: simulation or control group. All volunteers were first or second year veterinary students with limited or no experience on asepsis. Each volunteer attended a lecture and an in-person demonstration of each technique. Students in the control group had no additional instruction or materials. Students in the simulation group received a simulation model and were given access to the instructional videos. All students demonstrated their proficiency by aseptically preparing themselves and a canine cadaver for surgery. Each student's aseptic and patient preparation were video recorded and are being evaluated by three faculty members.

Results from the quiz were not significantly different between the simulator (94.4%) and the control (91.7%) groups. Questionnaire data revealed that students in the simulator group invested an average of 5.4h preparing for the procedure. Furthermore, 1.9 hours were invested practicing with the simulators. This contrasts with the total of 2.5 hours invested by students in the control group (Figure 1). Direct demonstration from the instructor was considered the most useful teaching aid by 86% of the students (Figure 2). Amongst all teaching aids used, 100% of the students listed the videos as helpful. Podcast and handouts were considered not helpful by 36% and 29% of the students, respectively (Figure 3). Grading of student's proficiency is ongoing. We expect to confirm our hypothesis, that the use of instructional video modules, in addition to low-cost simulation models will increase student proficiency and confidence in asepsis.

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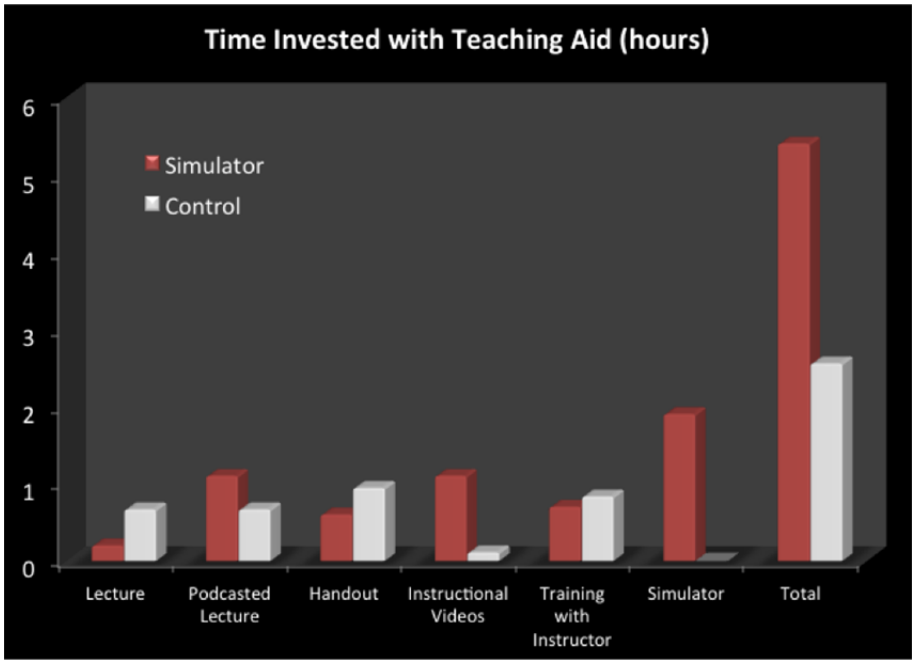

Figure 1: Time invested

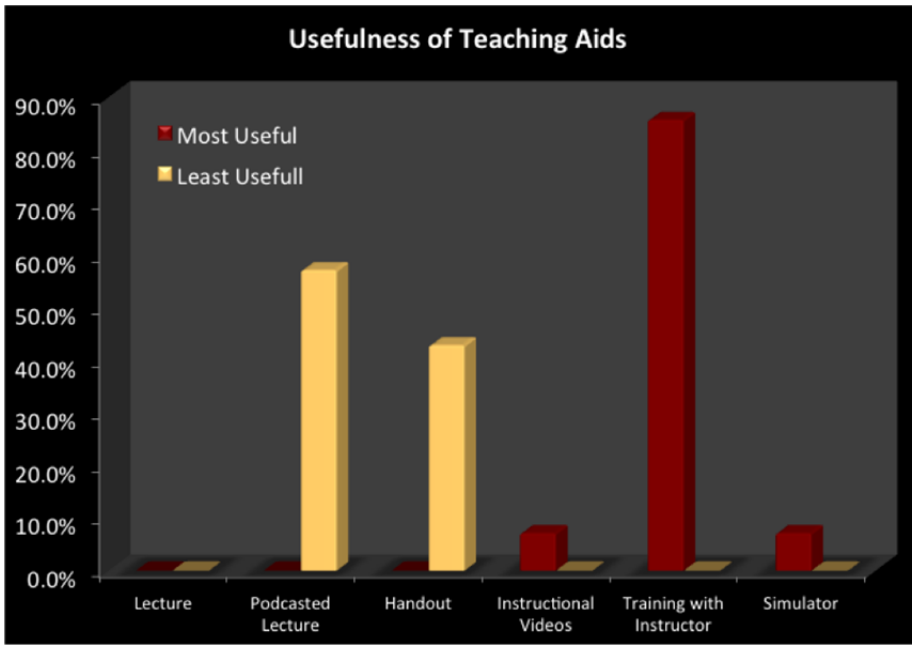

Figure 2: Usefulness

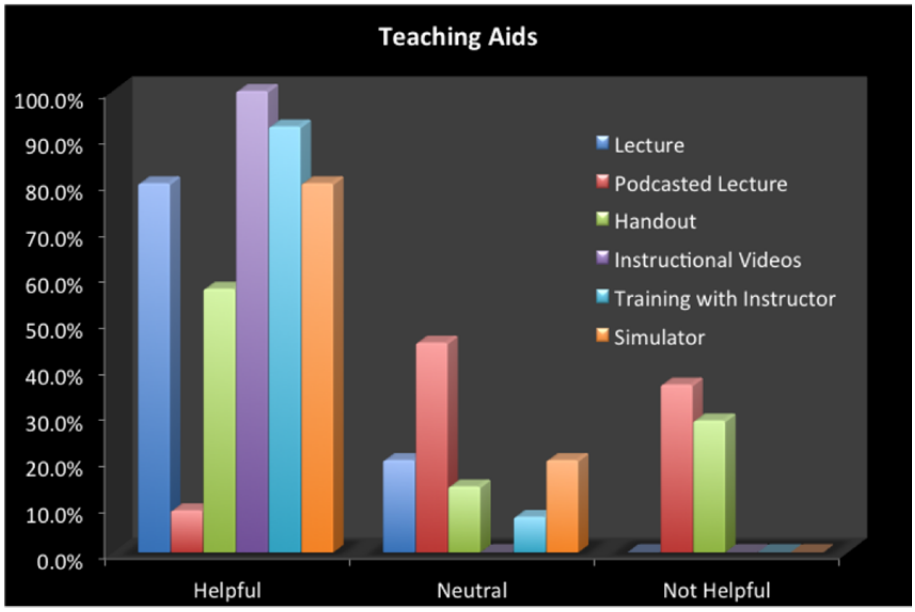

Figure 3: Helpfulness

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Did unsupervised practice of clinical pathology procedures in a Skills Laboratory improve examination confidence and performance?

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Third year veterinary undergraduate students (n=180) were exposed to two supervised practical sessions of 2.5 hours duration within the clinical pathology module. The class was divided into 7 groups and each group consisted of 25–26 students. Three staff members (lecturer, resident and technologist) were present to teach and assist students during the practicals. Each student group was exposed to haematology related laboratory procedures (making and staining a blood smear, microscopic blood smear evaluation, performing a packed cell volume, total protein measurement using a refractometer and performing an in-saline agglutination preparation with microscopic evaluation) during the first practical session. The second practical session consisted of a full urinalysis that included an organoleptic, physical and chemical evaluation and a microscopic sediment evaluation. After the practical exposure, 45 of the 180 students were randomly selected to do the clinical pathology examination, while the remaining students were randomly allocated to one of the three other examination panels (Small Animals, Production Animals, Equines). Students were assigned to the different stations on the day of the examination.

For the first time this year students had the opportunity to utilise the clinical pathology laboratory working stations in the newly opened Skills Laboratory to practise all the above mentioned procedures before the examination. This additional practice was not compulsory and was unsupervised. The Skills Laboratory registered a total of 219 visits for clinical pathology procedures in the four days before the examination. These visits were of 0–30 minutes (n=29), 30–60 minutes (n=38), 2–3 hours (n=18) and 3–4 hours (n=2) duration, with the majority of visits taking 1–2 hours (n=132). Ten students visited the Skills Laboratory three times to practice procedures, 41 students twice and 107 students visited once. Out of the 180 students, 158 (88%) visited the Skills Laboratory.

Thirty-one of the 45 students doing the clinical pathology exam filled in a questionnaire about the usefulness of the unsupervised Skills Laboratory practice before the examination. Thirty of the 31 students did visit the Skills Laboratory to practise, of which 20 students visited once, 9 students twice and one student three times. Eighty-four % of questioned students (26/31) said that the additional practice opportunity helped them to become confident in the procedures, that they were less stressed about the examination and that their performance in the examination would not have been the same without it. Additionally, all students that had used the Skills Laboratory and filled in questionnaires enjoyed practising clinical pathology procedures in the Skills Laboratory.

Feedback from internal as well as external examiners indicated that students were more confident, better prepared and performed better than in the previous year. Direct comparison of marks of this year's examination to last years' was not possible as some other factors were also changed (differently structured examination, marking in rubrics etc.).

In conclusion, subjective feedback evaluation showed that the additional practice opportunity had a positive effect on the students' confidence, competence, stress levels and overall examination performance. It also showed that the majority of students made full use of this learning opportunity even without any prior experience in a Skills Laboratory.

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14

vetPAL: A student led peer-assisted learning initiative

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A student-led peer-assisted learning (PAL) programme has been introduced at Bristol Vet School by final (fifth) year students who acted as tutors to fourth year students. The tutors taught skills in the Clinical Skills Lab and led revision sessions for small animal, equine and farm animal clinical science. The vetPAL programme was advertised to fifth and fourth year students via email, and tutors and tutees were selected on a first come, first served basis.

All tutors received training and attended workshops with activities including how to structure a teaching session and set objectives, George and Doto's five-step method for teaching clinical skills, and leading interactive student-centred revision sessions. The tutors worked in pairs or threes and produced a session plan including aims and a timeline and listed supporting resources. The plan was checked and signed off by a member of staff. Tutors were also supplied with a 'what-if' flow chart, a decision-making tree for any eventualities from misconceptions in knowledge (to be reported to lecturers) to accidents or student issues that required referral to tutors or other staff.

Each session lasted approximately one hour and took place in the evening. As vetPAL was being delivered for the first time a member of staff was present but was not involved. The clinical skills sessions involved three stations lasting twenty minutes each, which fourth year tutees rotated around. The stations were:

1. Clinical examination of dogs – using models and live dogs
2. Small animal suturing – on silicon pads and checked T-towels
3. Bovine intramuscular (im) injection – on a home-made model mounted on a bench at cow height, and collecting jugular blood sample using a vacutainer – on a wall mounted bovine head and neck model.

The revision-based sessions involved tutees choosing to attend one of a number of topics for an hour. Topics included subjects fifth years deemed important but commonly misunderstood and covered a broad range of subjects including bovine fertility, common problems of the equine hindlimb, ocular lesions, the atopic dog, feline lower urinary tract disease, and cat flu.

Questionnaires were distributed at the end of each session to tutors and tutees. 80% of tutees at the clinical skills sessions and 95% at the revision sessions marked the sessions as extremely beneficial. Common themes in success include informal atmosphere, not being afraid to ask questions, small group sizes and the tutors being able to easily relate to the position of the tutees. Tutors described development of communication and teaching skills, increased ability to summarise a subject and greater self-confidence as personal benefits.

Following the success of the initiative, final year students are in the process of handing vetPAL on to the fourth years who will become next year's tutors.

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15

Using a video as a new tool to disseminate the best teaching alternatives to the harmful use of animals in veterinary education in Latin America

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Over 126 million vertebrates and invertebrates are estimated to be used annually in biomedical research, toxicological tests and in education and training worldwide. Furthermore, 2 to 3% of these animals are used for teaching and training in medical courses as veterinary [1]. However, 33 scientific papers no less suggest that for biomedical students who learned using alternative methods, 39.4% have achieved higher or equivalent results compared to those that have undergone traditional learning [2].

However, the teaching replacement of live animals when compared to the replacement of animals in scientific research appears more developed, and may be considered as applicable in almost current tertiary teaching protocols [3].

Some studies suggest Replacement of harmful use of animals in medical colleges is hampered by lack of information and discussion on alternatives, official data, as well as concern about financial investment and effectiveness of "alternative" methods [4].

Using video to demonstrate examples of Veterinary Colleges that are already using humane methods in teaching, with the same pedagogical rigor and with the same pedagogical results to other coordinators and teachers becomes an important tool in the dissemination of this concept. With this objective, in March 2015, World Animal Protection undertook a project to document use of the main alternative methods in 4 Veterinary schools in Latin America, University Mayor de Chile, Universidad CES Colombia, Universidade Anhembi- Morumbi – Brazil, and Universidad del Valle del Mexico (Figures 1–3).

A DVD ("The Best Alternative methods to the harmful use of animals in Veterinary education in Latin America") is currently being developed which will be used to demonstrate humane methods that are already being widely used by schools in the Latin America region. This will also encourage increased engagement by vet schools and educators with effective and ethical "alternatives" through testimonies and interviews with renowned lecturers, deans and students.

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Figure 1: Filming at CES university 1

Figure 2: Filming at CES university 2

Figure 3: Filming at CES university 3

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16

Analyzing the demand for video material in veterinary education

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The University of Veterinary Medicine Hannover Foundation (TiHo) is producing video material for veterinary students.

On the one hand the TiHo is providing worldwide accessible videos on YouTube, on the other hand some lecture recordings are already available at the university homepage (http://www.tiho-hannover.de).

Educational videos are uploaded to the TiHo YouTube channel “TiHoVideos” as a studying aid. YouTube users can subscribe to the channel and videos are being watched frequently. Video instructions showing the correct approach to the different learning stations in the Clinical Skills Lab (CSL) were produced and uploaded.

Lecture recordings with lecturnity® by imc and web seminars (“webinar”) recorded with Adobe®Connect™ by Adobe Systems (Deutsches Forschungsnetz, DFN) are available either openly or password protected. To improve teaching methods, lecture recordings with the software Opencast Matterhorn® by the Opencast Community are planned and in production. Opencast Matterhorn® is free open-source software to manage educational audio and video content, e.g. produce lecture recordings, manage the contents and distribute the material to the students.

In order to evaluate the users’ attitude towards video material in veterinary education, this study concentrates on the perception of the veterinary students and lecturers.

To evaluate the actual utilization of the TiHo YouTube videos, veterinary students will be asked to complete questionnaires with regard to their study sessions in the CSL.

Their experience with those YouTube videos in addition to whether and in what way their experience in the CSL was influenced from watching them will be rated and evaluated.

The expected data will help to outline the correlation between the usage of YouTube videos and students’ visits to the CSL.

The demand for veterinary lecture recordings amongst students and lecturers is to be determined by using questionnaires in combination with focus group interviews. A prepared guideline for the focus group interviews will lead the qualitative collection of data.

The guideline for the focus group interviews and the questionnaires are being developed. First results in this ongoing study will be presented at the InVeST conference.

The production of video material is complex, so the demand for and the utilization of these videos needs to be assessed. With the expected data, the videos can be further adapted to the needs of the students to ideally support their learning experience.

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17

Evaluation of clinical skills training in veterinary education using audio-visual instructional animations and low-fidelity models

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Institute of Veterinary Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, Leipzig University, Leipzig, Germany

Veterinary medical education in Germany conveys large quantities of theoretical knowledge in a densely packed curriculum. The acquisition of Day-One-Skills is recognized as an essential part of education but training opportunities for developing these essential clinical skills are rare in the Curriculum. Alternative teaching methods in form of clinical skills simulators provide good training opportunities for the students developing their practical skills.

Multimedia-based teaching materials have repeatedly been shown to serve as valuable learning tools. They are used with increasing frequency and intensity and their popularity among students is high. Among these especially audio-visual material can enhance veterinary students' learning success in comparison to traditional linear ways of learning. Po"t"casts are audiovisual flash-animations originally composed for teaching anatomical topics (from formalin pot to po"t"cast"). In this study potcasts were developed to provide students a step by step information and instruction on a clinical skill.

The purpose of this study was to evaluate the training of specific clinical skills using potcasts and low-fidelity simulation training.

Two instructional potcasts and two low-fidelity models of canine intubation and canine female urinary catheterization were used. In a crossover study design both, acquired psychomotor and cognitive skills of two intervention groups after a different theoretical preparation were compared. A survey captured the participants' feedback. Sixty first year veterinary students were randomly allocated to two groups (potcast group and text group). For the same duration of time for preparation the potcast group watched a potcast while the text group read an instructional text which served as the screenplay of the potcast. Then both groups had separate self-directed training sessions on low-fidelity models. Outcomes were assessed in practical examinations on a cadaver using an objective structured clinical examination (OSCE) checklist and written memory tests.

The potcast group performed significantly better in both OSCE and memory tests than the text group in study "intubation" (OSCE: p 0.004; memory tests: p 0.001) but no significant differences were observed in study "catheterization" (OSCE: p 0.762; short-term memory test: p 0.335; long-term memory test: p 0.662). Overall, participants enjoyed clinical skills training but experienced self-directed learning as challenging.

Clinical skills training using potcasts and self-directed low-fidelity simulation training are a good combination for students. However, they should be complemented by supervisor or peer instruction rather than used as exclusive tool for teaching first year veterinary students.

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Topic: Skills + Simulation 2

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Using computer simulation to enhance learning in a clinical skills laboratory environment

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Utilizing high fidelity mannequins, many day one skills can be transferred to students. These instructional exercises are effective at helping students master how to perform these skills, but do not provide context for management of the patient as a whole. Computer-based clinical simulations can provide this context.

We believe that the combination of mannequin-based skills training and computer based simulations of clinical problems will provide a more complete learning experience. The mannequins used will be both handmade and commercially available phantoms. The computer simulation will be the Virtual Clinic of the Veterinary Information Network (VIN).

The first combined training, to be launched in September 2015 is the management of acute, hypovolemic shock. The three step exercise will require students to first stop bleeding using custom made bleeding limb models. The next step will be to provide an intravenous route for fluid administration, using custom built IV catheterization models. The final step will be to manage the fluid resuscitation and stabilization of their patient presented to them in the Acute Hemorrhage Simulator of the VIN Virtual Clinic.

Students will be scored on their performance by summing the results of an objective scoring chart of their performance with the mannequins, and the built-in performance review of the VIN Virtual Clinic.

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19

Best methods for surgical planning with 3D printing

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This poster session will highlight the methods used by Michigan State University's College of Veterinary Medicine for surgical planning using 3D printing technology. This resource is becoming increasingly vital for the small animal orthopedic service and is now being carried out on a regular basis. The process utilizes off the shelf, commercial software including Materialise Mimics and Autodesk 3DS MAX, and produces a model that is available the next business day using a consumer grade 3D printer. Rapid turnaround is essential and oftentimes multiple models are required in order to serve as teaching tools for residents, interns and students. As 3D printing technologies continue to evolve, the model creation time has been rapidly decreasing while the accuracy and level of detail continues to improve.

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The OPUSheep - Development of an interactive 3-dimensional sheep ultrasound examination simulator

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Transabdominal ultrasound (US) examination is an accurate method of pregnancy diagnosis in sheep from about 35 days of pregnancy. The early determination of pregnancy and detection of multiple fetuses have a major influence on economic and managemental decisions in the sheep farming industry, which is the predominant livestock industry in large parts of central and western South Africa. Pregnancy diagnosis by US is therefore an important day 1 skill for South African veterinary graduates. Hands-on training opportunities for undergraduate veterinary students are limited and not every final year student has sufficient opportunity to perform the procedure. There is therefore a clear need for a simulator which could assist students in attaining these skills. The objective of the project was to develop a life-like model combining manual and electronic components which could be used in teaching for correct probe placement and interpretation of images.

A collaboration between the Faculty of Veterinary Science and the Faculty of Engineering, Built Environment and Information Technology of the University of Pretoria, South Africa, resulted in the development of a simulated scanning environment that combines an Automated Diagnostic System (ADS) with iButton technology and a Graphic User Interface (GUI). A life-size sheep model with a mobile right hindleg giving access to the right groin for scanning purposes was preserved by a taxidermist and iButton tags were fitted into the model. A simulated US probe with iButton sensors interacts with the iButton tags in the sheep model and is connected to a computer or laptop with the device software for the ADS. The GUI represents the US device. During the scanning procedure, correct placement of the probe results in real-time display of a randomly selected grey scale ultrasound image on the computer. Images are randomly chosen from the image library within the ADS. The operator can evaluate the image and make their own diagnosis of pregnancy, gestational age, and fetal number (singleton vs multiples) before allowing the system to make the diagnosis. The ADS has been found to be 76%–84% accurate. The system also evaluates probe contact strength and probe placement as indicators of good operator technique. If the probe is not placed in the correct anatomical region an error message is displayed on the screen.

In conclusion, the system has been found to be easy to use and educational, and to successfully replicate a sheep scanning environment. Further development and validation of the system is underway.

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21

First veterinary simulator for the abdominal sonography of the cat – with focus on kidneys

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Abdominal sonography is one of the most important diagnostic imaging methods in the field of veterinary medicine. However, a high level of theoretical knowledge as well as numerous hours of practical training are necessary to produce valuable images and to correctly interpret them. Until now the practical education of sonography occurs entirely with living and mostly healthy animals. In contrast to veterinary medicine, human medical education has successfully used simulators for ultrasound training for more than 20 years.

Objective of this work was the development of a simulator for the abdominal sonography of the cat. Another important aspect in developing this simulator was to create the possibility of examining “sick animals” with simulation as well as making sufficient practical training available for all students and veterinarians without affecting animal welfare acts or laws.

Three-dimensional ultrasound datasets of abdominal organs of 43 death cats were created with the ultrasound system „MyLab Twice“ (Esaote, Cologne, Germany). These datasets included physiologic and pathologic kidneys. Furthermore, abdominal anatomic serial sections, three-dimensional computer tomographies (CTs) and magnetic resonance images (MRIs) of the abdomen of adult cats were created. The feline abdominal sonography simulator works on the basis of the SonoSimIII by Sonofit GmbH, Darmstadt, Germany.

Ultrasound examinations can be carried out on cat models in dorsal or lateral recumbency as well as on standing “cats”. The kidneys are explored with a linear transducer and are then screened in transversal, sagittal and horizontal views. This corresponds to real sonographic examinations of kidneys. Size is determined with help of range and area measurements. The special feature directly compares the ultrasound images with corresponding anatomical sections, as CTs and MRIs improve the anatomical and topographical imagination of the examiner. A further advantage of the simulator is the integration of diseases. By solving exercises (with solutions), the user can also check his newly developed skills.

Using the new simulator, feline abdominal sonography can be practiced under guidance or independently and the acquired skills can be subsequently checked.

The educational value of this first veterinary simulator for abdominal sonography as part of the students’ clinical education and training for veterinarians will be evaluated objectively in the winter semester 2015/16. In addition, future attempts to create suitable three-dimensional ultrasound datasets of living cats will be carried out soon.

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22

The world’s first simulator for echocardiographic examinations in cats

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Performing echocardiography properly requires many hours of training. Echocardiographic examinations are especially stressful for cats. Therefore, finding animals for training purposes is difficult. Furthermore, laws concerning animal welfare restrict the use of living animals for educational purposes.

For this reason, an echocardiographic simulator for cats has been developed.

This ultrasound simulator consists of three-dimensional echocardiographic datasets, two cat models on a model echocardiographic examination table and a model transducer in a computer unit combined with an electromagnetic tracking system: the SonoSim III developed by Sonofit GmbH, Darmstadt, Germany.

Three-dimensional echocardiographic datasets of two healthy and three diseased cats (suffering from hypertrophic cardiomyopathy or a ventricular septal defect) were further processed. In order to improve quality, each image contained in the dataset was processed with the same color scheme, in which the inner parts of the heart were blackened, the left heart was colored in red, and the right heart was colored in blue. These datasets were included in the SonoSim III.

Additionally, two cat models have been developed. They are equipped with special features, such as elbow skinfolds and palpable ribs for improving orientation and consist of a foam core covered with fake fur. One model is designed in left lateral, the other one in right lateral recumbency. The cat models are lying on an examination table, which allows the examination to be conducted with the model transducer from below.

With the feline echocardiography simulator, the learner is able to practice examining a healthy cat in long- and short axis views from the right side and left apical three, four and five chamber views, in colored and in black and white version. The learner can practice echocardiography autodidactically with the help of the Follow-Up feature. In this mode, a special task is given and the simulator gives feedback whether the task is completed or not.

For advanced learners, it is possible to use the feline echocardiographic simulator for diagnosing heart diseases, as the datasets of three diseased cats are also available during simulation.

In a survey carried out among senior students at the Ludwig-Maximilians-University of Munich who evaluated the feline echocardiographic simulator, the respective standard views produced in the simulator were evaluated with ‘very close to reality’ by 50–38% and with ‘close to reality’ by 57–53% of the students. Additionally, the use of examining “diseased cats” was evaluated with 97% as ‘very useful’ and the simulator as a supplement for living animals in practical education was evaluated by 89% with ‘very good’.

As it becomes more difficult to use live animals in veterinary medical education, the importance of simulation is constantly increasing. This feline echocardiographic simulator provides students with the chance to practice echocardiography on cat models under near-realistic conditions, without the use of living animals. This improves education significantly and allows animal welfare laws to be respected.

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Topic: E-Learning

23

Case-based e-learning model “CASUS” – “Health management in pig farms” as a complement tool in the practical veterinary education and advanced training

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Using an interactive, case- and web-based tutorial “CASUS - Learning with virtual patients” veterinary students are enabled testing their individual learning success as well as preparing themselves for practical procedures and exams. At the University of Veterinary Medicine Hannover, Foundation Germany currently various “virtual patients” created with CASUS are offered for the preclinical and clinical veterinary education. This project is supported by the Competence Centre for E-Learning, Didactics and Educational Research in Veterinary Medicine (KELDAT).

The project is focused on pig herd visits and subsequent diagnostic procedures. On farm data from herds with typical pig diseases were collected and transferred to e-learning-based cases (virtual herd visits). Six CASUS cases were created on the subject areas of respiratory, intestinal and skin diseases, diseases of the nervous system as well as locomotive disorders and reproductive failure. More virtual cases are in preparation.

Following up these virtual herd visits students can learn about the principles of herd health management and test their knowledge with regard to clinical symptoms of typical diseases, diagnostic procedures, interpretation of diagnostic results and recommending necessary treatments and prevention programs to the farmer.

CASUS offers some benefits compared to other learning methods. It uses a user-friendly interface with minimal system requirements. Furthermore it provides optional multimedia integration like videos, pictures and audios as well as discussion forums. The expert modus allows users in addition to read up on more detailed and extensive information about diseases, diagnostic procedures, treatments, etc. These communicative and interactive possibilities facilitate understanding and provide self-control and individual learning success. Students directly receive their learning feedback at every stage of the case work.

Seeing, listening, recognizing, showing, trying and communicating enable a realistic learning. CASUS can serve as a bridge function between theory and praxis.

Animal welfare principles can be supported by using virtual patients. Thus, subsequent practical procedures can be performed faster, safer and more experienced, leading to less stress in animals (refinement). Moreover, fewer animals are needed for the practical exercises because of better theoretical knowledge and suitable preparation of the students (reduction).

Since 2013 a yearly doubling increasing number of students has taken this option of learning and found thereby an improved preparation for tests and practical exercises. On average each student has successfully processed two cases and has invested 40 minutes per case in time.

By independent evaluation of their learning success, students were given security and were provided with a complementary way of individual learning.

In the future “virtual patients” created with CASUS shall be offered in English language for expanding CASUS on EU-level.

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Conceptual design and realisation of the e-learning of the berliner kompaktkurse – evaluation of user satisfaction via online survey

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With the seminar program berliner kompaktkurse the berliner fortbildungen has offered advanced training for scientists and staff of biomedical research since 2005.

Since 2012 the continuing education course “Geprüfte/r Tierpflegemeister/in” (certified master course for animal caretakers) and since 2014 the FELASA B and C courses are designed as blended learning courses. The respective theoretical contents (certified master course for animal caretakers: 180h, FELASA B course: 20h, FELASA C course: 40h) are provided via a customized learning management system. This learning environment is based on Drupal, the programming was performed by the company Computer Manufaktur GmbH, Berlin.

Designing this learning platform it was important for us to include following aspects:

- Intuitive usability, also for users with minor web 2.0 experience (user account, navigation, course slide)
- Clear arrangement and consistent appearance
- Multiform interactive components (diverse quiz functions, mouse over function, discussion forum, e-note pad, poll function)
- Multimedia-based and multimodal learning (audio tracks, videos, images, downloads, script incl. notes)
- Possibility to check the participants’ activity (quiz, first run only page by page, time tracking)
- Administrational work (registration, mail communication)
- Integration in existing web page and corporate design

Using a characteristic orientated online survey we will compare these requirements with the evaluation by all participants of 2014 (n=261). The aim of the survey is to detect sources of user dissatisfaction, to identify critical aspects of course administration and attendance and reveal points of improvement. We will create a questionnaire which covers all topics from above and consists of items with even numbers of answers plus the possibility to abstain, as well as a field for free comments. Further, we will ask for demographic data.

We will use the obtained data to determine actions to be taken to improve user satisfaction and usability of our e-learning platform. To evaluate the effectiveness of the measures we plan to conduct a follow up survey one year later.

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The iVetSchool Application: a multimedia approach to supplementing veterinary medical student education through problem based learning

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Students’ assessment of clinical cases in teaching hospitals is a principle tenet to veterinary education worldwide. Training large animal veterinarians has become increasingly more challenging due to the decreasing numbers of food animal and equine cases at many veterinary colleges. With increased urbanization, the decline in large animal cases admitted to veterinary teaching hospitals has continued. Preservation of cases in a digitally based, interactive fashion is a logical step in the evolution of veterinary education and could contribute significantly to teaching in the veterinary curriculum. The iVetSchool App, developed by the investigators, uses media rich, clinically based case studies to train students in a problem based learning format. The app allows instructors to replace traditional, text-based cases in Problem Based Learning courses with an interactive format that is more engaging for today’s technologically inclined veterinary student population.

The purpose of this innovative idea was to address deficiencies in clinical case exposure by identifying exemplar large animal cases and developing them into multimedia-based case studies. Large animal veterinary educators developed a list of technical procedures with an emphasis on both techniques and skills required to diagnose, manage, and treat large animal diseases by an entry level veterinary practitioner. Actual clinical cases were used to develop the media-based case studies. The case studies walk students through a media-based clinical case from history and diagnosis to treatment and outcome. In addition to teaching clinical problem solving and reasoning skills, each case study was designed to teach specific large animal diseases or food safety techniques. In conjunction with the writing the text based portion of the case studies, appropriate aspects of the clinical case were digitized to produce the final media-based case study. Examples of integrated multimedia include videos of techniques, photographs of patients, audio files, diagrams, radiographs, laboratory results, and text-based content.

A key point to the efficacy of an instructional program incorporating the use of an App is that students must enjoy the format of the training and want to continue its use. Therefore, students were asked to evaluate the App at the end of the semester with a survey. The survey contained two scales each comprised of four Likert scale items and seven open-ended questions designed to illicit deeper insight into the students’ perspective regarding the iVetSchool App. Students had an overall positive response (3.6/5) indicating that they enjoyed using the App and that it helped them learn relevant material. Positive comments about the App included that students were able to work at their own pace anywhere and anytime with

nearly 25% of the students volunteering that they enjoyed the variety of cases available. The most common criticism of the App was that students did not always like the way their answers were scored. The overall student evaluation of the App was positive and warrants further integration into veterinary curricula.

Although the iVetSchol app is designed for veterinary students, the App is a reference library of archived clinical cases that may be useful to practicing veterinarians, animal scientists, and secondary/postsecondary agricultural educators anywhere in the world.

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Development and evaluation of two anatomical po“t”casts for students learning the anatomy of the tongue

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“VetAnaTube”, a working group at our Institute deals with the production of multimedial learning material. Especially “potcasts” are used frequently by students. Potcasts are audiovisual flash-animations featuring specimens of the anatomical museum.

The aim of the present study was to evaluate whether and to which extent potcasts enhance the learning effect in veterinary anatomy in comparison to traditional linear ways of learning.

Two potcasts featuring the anatomy of the tongue were developed. Images of specimens and a descriptive text were combined to an audivisual animation using the software Adobe Flash Professional. 1st and 2nd year students (n=101) were randomly allocated to a “potcast-group” and a “text-group”. After ten minutes of preparation (watching the potcast vs. reading the text) students took a written mini-exam (10 questions). In addition the potcast-group was asked to complete a feedback sheet (6 step scale).

Evaluation of the test revealed that the potcast-groups of both years achieved better results compared to the text-groups. Total results for right answers of the 1st year students show that the potcast group (47.8%) was up to 6.4% better than the text group (41.4%). In comparison 2nd year students in both groups achieved higher rates of right answers (84.8% vs. 78.9%) again in favour of the potcast group. These differences varied within the individual questions.

Potcasts clearly improved learning success and knowledge retention in comparison to simple text forms. Thus they are suitable for acquiring and refreshing knowledge in veterinary anatomy.

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Development of 4D virtual farms

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Compared to veterinary graduates of the 20th century, veterinary students in Australasia are now more likely to come from a non-rural background and to work a considerable distance from where they have studied for at least some of their career. While students are required to spend time working on different livestock farms during their degree, it is not possible to spend time on all enterprise types and environmental conditions. These factors increase the need for best-practice education to improve student understanding of the wide variety of agricultural enterprises.

We have developed high-resolution, panoramic, four-dimensional (360 degree through time) virtual farms across Australasia, using funding from the Office of Learning and Teaching (OLT) to allow students to view many different farm enterprises (Figure 1). At each collaborating veterinary school, staff members identified appropriate properties for selection, and images were collected over multiple sites on the farm. The location of each image is recorded using GPS, allowing images to be taken from the same location over multiple visits, giving the fourth dimension (time).

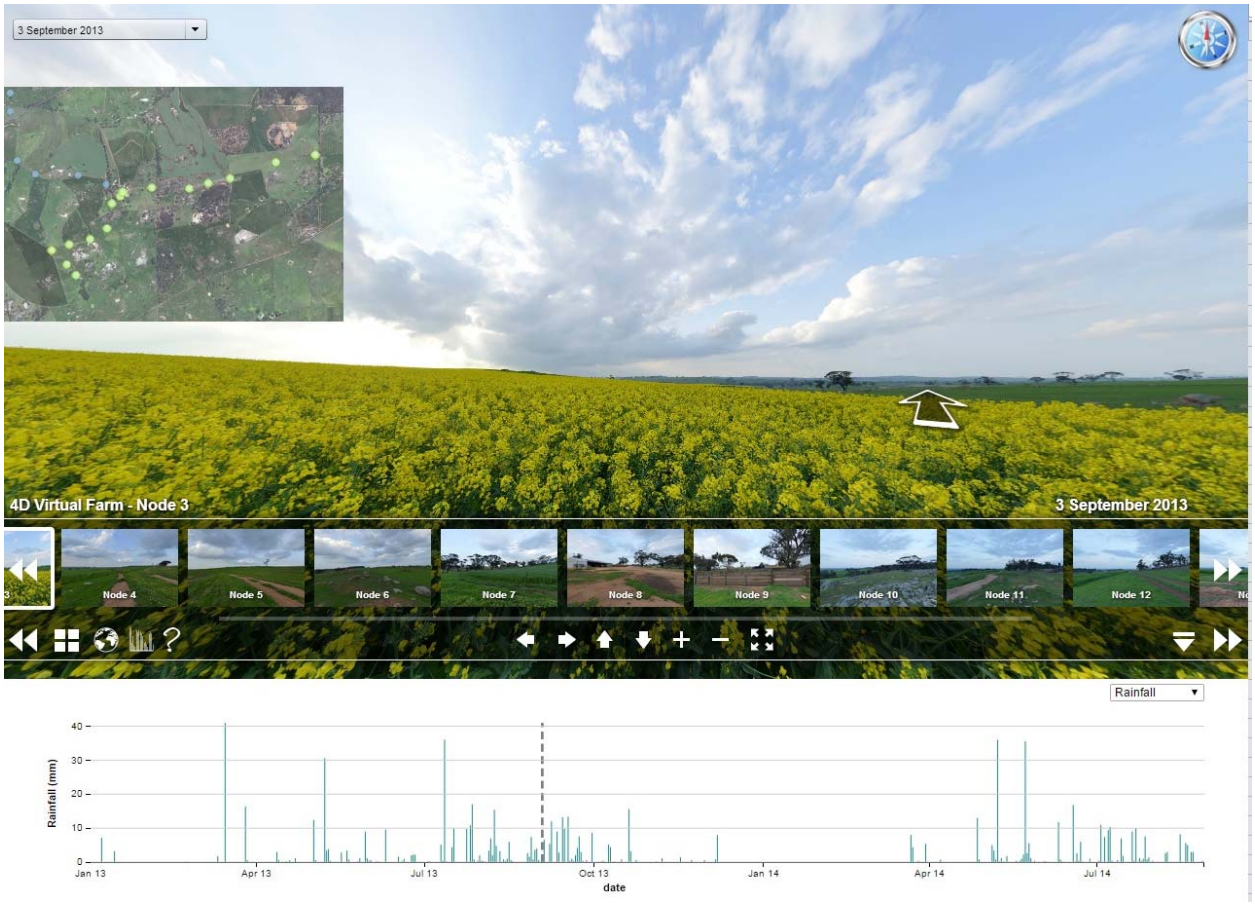

Figure 1

Various files including video, photos, pop-up windows, documents and links to web sites can be embedded within the framework of the property view, allowing the integration of learning and assessment resources within the tool. Development of the virtual farms gives students the next best experience to visiting each property. It allows them to view what occurs on a property over the year, with real examples of what happens in the convenience of the classroom or at home at a speed that suits them.

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The global resource for online evidence-based veterinary medicine learning

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Evidence-based veterinary medicine (EBVM) can be defined as the use of the best and most relevant available scientific evidence in conjunction with clinical expertise to make the best possible decision about a veterinary patient, while considering the circumstances of each patient and its owners/carers.

To help direct the uptake of EBVM in the veterinary consciousness, we have assembled an extensive international team with a collective passion for delivering high-quality teaching of EBVM. The team is currently working together to develop an open access series of online, re-usable learning objects presented as a coherent web tutorial designed to introduce learners to the key concepts of EBVM.

The resource will be organised into modules addressing the five key areas of EBVM:

- Ask – how to formulate answerable questions
- Acquire – how to obtain relevant information
- Appraise – how to evaluate the available evidence
- Apply – how to apply the evidence to clinical practise
- Assess – how to measure the effect of implemented changes

The purpose of this online resource is to introduce EBVM to learners, hence it will be appropriate for students and practitioners for self-study; it is also envisaged that the resource will be used in whole or in part as standalone teaching modules to support other EBVM teaching. The resource will utilise best pedagogical approaches, and will include formative multiple choice questions, short tasks and recommendations for further study. Development of the resource will follow an iterative cycle of development which includes review by both the core team as well as other identified stakeholders (e.g. students, practitioners, industry representatives).

It is hoped that the development of this resource will increase awareness of EBVM in the veterinary profession, and allow practitioners the opportunity to develop the skills needed to utilise EBVM in everyday clinical practice. Future aims of the project team include designing methods of cataloguing and disseminating evidence syntheses to support clinical decision making and evidence-based veterinary practice as well as building a community of practice in this area.

The project team would like to acknowledge RCVS Knowledge for funding the development of the online EBVM resource.

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Engagement, repetition and tracking: Using of a mobile device application to teach anesthesia dose, fluid and infusion calculations

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The ability to accurately and quickly perform anesthetic drug and infusion rate calculations is an essential skill that must be mastered by veterinary students, yet many students view these calculations as being difficult, tedious and unengaging. In response to student requests for practice problems we have created a mobile device-based anesthetic problem generator with the goal of improving student engagement while providing practice problems on demand. The VCalc application combines a dose, fluid rate, and infusion problem generator with a cloud-based database to record student attempts as well as the number of problems of each type that were answered correctly.

One hundred twenty eight veterinary students enrolled in an anesthesia course were studied to evaluate the acceptance and learning efficacy of the application. Students were assigned to install the application onto their personal phone, tablet or PC and complete three problems of each type (9 total). Subsequent to attempting the 9 problems on the app, students completed an examination which included 4 calculation questions (1 Drug, 1 Fluid, 2 Infusion calculations). After completing the examination, students submitted a survey of attitudes and opinions concerning the applicability and usefulness of the app.

All students installed or accessed the app and attempted at least one of the problems. The 128 students enrolled in the class attempted 2337 total problems, averaging 7.4, 7.4 and 6.5 Drug, Fluid and Infusion problems per student respectively. Students correctly answered a total of 1400 problems, averaging 5.0, 4.5, and 3.3 Drug, Fluid and Infusion problems per student answered correctly. The 4 exam calculation questions were all answered correctly by greater than 92% of the students. The survey indicated that a majority of students found that the app was useful or very useful for practicing anesthetic drug calculations and would like to see more apps developed and used within the curriculum. Finally, 77% of students reported that they had used the app to study for the exam.

The VCalc practice app was perceived as a useful and engaging instructional tool and was used by a majority of students to study for the exam. Students wished to see more apps developed and used within the veterinary curriculum. The VCalc application is available for Android, iOS and Windows platforms.

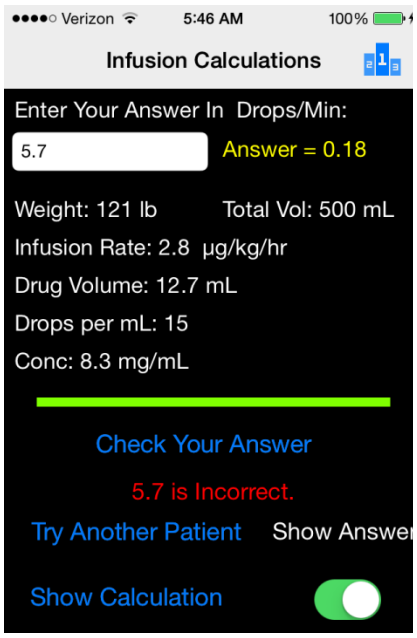

Figure 1: VCalc Main Screen

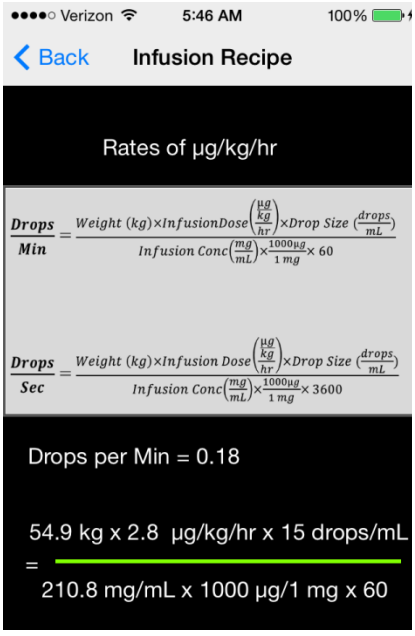

Figure 2: VCalc Solution Page

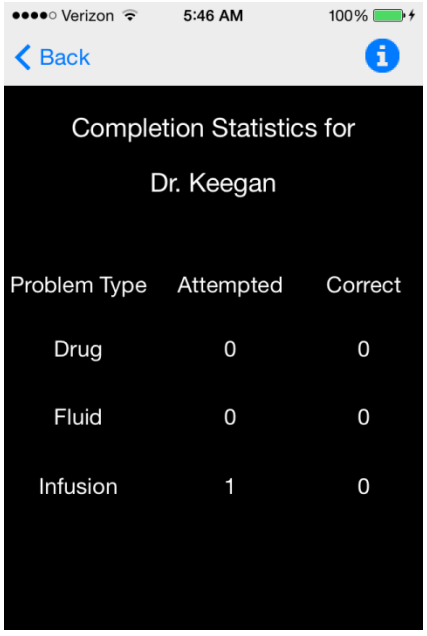

Figure 3: VCalc Stats Page

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Topic: Communication

30

Assessment of communication patterns of Canadian dairy practitioners during farm visits

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Veterinarians have important roles in dairy farmers' decision-making regarding farm management; they are often regarded as the most trustworthy and reliable sources of advice on disease and disease risk management. Consequently, competent communication is a core clinical skill for practitioners. There is clear evidence in human medicine and companion animal settings that communication skills can influence satisfaction, adherence and health outcomes. However, there is a paucity of evidence-based findings regarding communication skills used by food-animal veterinarians. Therefore, we are planning to conduct a study to evaluate interactions between dairy producers and practitioners.

Veterinary communication with dairy producers will be recorded during regular Herd Health visits. Ten dairy practitioners (each visiting seven farms) will be equipped with a GoPro® (compact, rugged camcorder). Conversations will be recorded and categorized using the Roter Interaction Analysis System (RIAS), a leading technique to analyze interpersonal communication. In RIAS, codes are assigned to communication units (e.g. phrases, parts of phrases, or single words). These codes can be divided in two broad categories: 1) codes related to gathering or verification of clinical and therapeutic information (=instrumental codes); and 2) codes related to expression of concerns, agreement, criticism, empathy, etc. (=affective or social codes). Codes will be used to describe and quantify communication patterns used by the dairy practitioners. We will assess the following: proportion of talk, information gathering, client education and counselling, relationship building, activating, partnership, and orientation.

Recording dairy practitioners will enable description of distinct communication patterns. Identified gaps can be targeted in teaching veterinary students and practitioners. Improvement of communication skills is expected to increase farmer satisfaction and adherence with veterinary advice. Results of this study will help veterinarians to become more effective proactive coaches and advisors for dairy farmers.

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Onsite communication skills education and outcomes assessment in a companion animal practice

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The objectives of the study were twofold: to provide communication skills education to veterinary professionals in the practice setting and to evaluate the efficacy of 6-month training by measuring veterinarian-client communication and client and veterinarian satisfaction pre and post-intervention.

This is a case-based pre-test/post-test intervention study of a veterinary practice in Denver, Colorado.

A purposive sample of three veterinarians and seven support staff were recruited to the study from a single practice.

The entire veterinary practice participated in the 6-month educational program that included interactive communication modules, individual coaching and a communication laboratory. Thirty-six clients participated in the study by having a wellness or problem visit video-recorded (18 pre and 18 post skill training). In addition, 180 clients completed satisfaction surveys (90 pre and 90 post skills training). The Roter interaction analysis system (RIAS) was used to analyze the visit videotapes, and physician visit satisfaction scale and client visit satisfaction questionnaire (CSQ) were used.

Compared to pre-training visits, appointments were 5.40 minutes longer ($p = 0.04$), veterinarians asked 60% fewer closed lifestyle-social questions ($p = 0.05$), provided more 1.40 more biomedically-related client education ($p < 0.01$), and used 1.5 times more facilitative ($p < 0.01$) and 1.25 times more emotional rapport ($p = 0.04$) communication. Clients provided 1.3 times more biomedically-related information ($p = 0.05$), tended to ask more questions ($p = 0.06$) and engaged in twice more social conversation ($p < 0.01$) in post-training visits. After the training, aspects of visit satisfaction improved for both

veterinarians and clients. Veterinarians perceived their clients as complaining less ($p < 0.01$), and more personable ($p < 0.01$) and trusting ($p < 0.01$), and clients felt more involved in the appointment ($p = 0.04$) and reported greater veterinarian interest in their opinion ($p < 0.01$).

The training fostered a more client-centered approach with greater client education, rapport and facilitation of client input in an unhurried environment, resulting in enhanced overall veterinarian and parts of client visit satisfaction.

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Using standardised client simulation to improve clinical reasoning in veterinary undergraduates

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Standardised patients are widely used in undergraduate medical education for a multitude of purposes, including clinical reasoning skill development. In veterinary education, standardised clients (SCs) are used extensively in communication skill training, but are not commonly used to achieve other learning outcomes.

A simulated client program focussing on clinical reasoning skill development has been designed and implemented into The University of Nottingham School of Veterinary Medicine and Science (UNSVMS) curriculum. During a clinical placement in a first opinion small animal practice, all final year students undertake three consecutive consultations with an SC. They are required to diagnose and treat the accompanying canine patient, and are debriefed on their decision making strategies afterwards. Each consultation is filmed for later analysis. The session is designed to mirror typical consultations faced by new graduates in a fully immersive setting.

The effect of SC simulation on clinical reasoning development is being evaluated in four ways:

1. Comparison of skill levels demonstrated in each consultation (using the Lasater Clinical Judgement Rubric (LCJR))
2. Student self-assessment of clinical reasoning (using the LCJR) pre- and post-simulation
3. Quantitative student survey feedback
4. Qualitative student focus group discussions

The study is ongoing but preliminary self-assessment, survey and focus group data suggest students' clinical reasoning skills improve as a result of the sessions.

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Preparing veterinary students for clinical placements by embedding simulation and clinical scenarios into small group clinical skills teaching

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A series of small group clinical skills practical classes were specifically designed and delivered in the 2014–15 academic year to help to prepare 3rd year veterinary students for their forthcoming clinical or 'Extra-mural studies (EMS)' placements in private veterinary practices. The content of these classes was informed both by results from a wider curriculum mapping exercise at the Royal (Dick) School of Veterinary Studies (R(D)SVS) plus feedback from students, faculty members and EMS providers.

Classes were badged under the umbrella term of 'Preparing for EMS', and key clinical skills were grouped together to produce the series of themed classes shown below:

1. Small Animal Skills
2. Large Animal Skills
3. Emergency and Critical Care Skills
4. Diagnostic Skills 1

5. Diagnostic Skills 2

Learning objectives were then formulated for each class, and these then informed the design of a series of ‘scenario-based stations’ that the students rotated around during each class. Most stations were based around typical clinical scenarios that a student may encounter during their EMS placements, and required them to learn a specific clinical skill e.g. urinary catheterisation of a male dog; or dose calculation, equipment selection and administration of an intravenous injection to a horse.

In order to provide additional relevant clinical context for each skill, the majority of scenarios involved a short clinical vignette which included the name of the patient plus a detailed signalment and brief clinical presentation. In addition, the Emergency and Critical Care (ECC) class was based around just one emergency patient, ‘Bruce’ a Labrador who had initially presented for surgery to remove an intestinal foreign body and then proceeded to ‘crash’ under anaesthesia, thus requiring a number of related ECC procedures to be carried out by the students.

Business skills were also embedded into the student learning experience in some classes, with the focus being for students to develop an appreciation of the cost of consumable items and common clinical procedures. Students were thus required to keep a log of the equipment and procedures that they had used on the various stations (e.g. intravenous cannula, pair of sterile gloves etc), and to then add up their total cost at the end of the practical class using a ‘price list’ generated using current 'real' prices from the Hospital for Small Animals at the R(D)SVS.

Low fidelity (e.g. UC Davis vascular access mannikins) and homemade simulators (e.g. modified Melissa and Doug® stuffed toys) were used in each scenario, thus making the classes affordable and deliverable to a year of 180 students. Each class lasted between 60–80 minutes and was delivered by two academic plus one technical staff member to 1/8 class sizes (approximately 20 students) in order to optimise the learning opportunities for each student.

Classes were extremely well received by students, and the ‘rotating station’ format with accompanying handout proved to be an efficient model for delivering clinical skills teaching. Future plans will focus on developing pragmatic methods for formative assessment of these clinical skills, followed by summative assessment using objective structured clinical examinations (OSCEs).

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Topic: Skills + Simulation 3

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Development of a low cost cow dystocia model

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Handling of bovine dystocia cases is a day one competency for veterinary graduates. For training purposes, obstetrical manipulations can be performed on abattoir or model calves. These procedures are usually done on tables were students can see which malpresentation, -position or -posture is present. It is however desirable to have students perform obstetrical manipulations blindly. An obstetrical examination leading to a diagnosis and management plan of the existing dystocia, as well as placing of ropes and other equipment while one can not see the calf in the birth canal can be challenging. Hands-on training opportunities for undergraduate veterinary students are limited and not every final year student has sufficient opportunity to perform the procedures. There are cow dystocia models commercially available but these are costly. Therefore an attempt was made to produce a low cost cow dystocia model that can be used with a dystocia calf model (Veterinary Simulator Industries, Canada). An existing steel frame was modified into a Holstein Friesian cow dystocia model. A removable dragon skin perineum was designed and a canvas uterus was made to certain specifications by a tent manufacturer. The canvas uterus has a full length zip lock on the dorsal surface for easy access and cleaning and can be removed from the steel frame. The birth canal was simulated by a narrowing with a 50 cm diameter within the steel frame. A large plastic garden refuse bin was cut into half, spray painted and attached to the sides of the steel frame using hinges for mobility. A black and white rope tail was attached to finish off the “Holstein Friesian look”. This model has proven to be usable and real enough, and to fulfill the main objective of handling a bovine dystocia blindly.

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Construction and implementation of a bovine obstetrical model as an interactive teaching method for veterinary students

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The acquisition of obstetrical skills in veterinary medicine is a complex learning process for veterinary students. It is important that the teaching process concentrates not only on theoretical knowledge, but also on practical skills in manual exploration and corrections of fetal dislocations. Therefore the use of obstetrical models is required and commonly used in veterinary education. Nevertheless, available commercial models (vet simulator industry, Calgary Canada) are very costly and only available overseas. It is well documented that learning is expected to be most effective when given topics are not only reproduced but also the intensive reflection on a related problem is enabled or the information is transferred from one format (e.g. printed information) into another format (e.g. manual implementation).

Therefore, the objective of this project was, to develop and construct a model for the interactive teaching of bovine dystocia in context of an elective workshop for veterinary students. The students were supposed to define the most important requirements for a bovine obstetrical model and to realize those requirements in the construction of an obstetrical model.

The project was conducted in context of 2 consecutive elective workshop modules for veterinary students in the 3rd and 5th year of veterinary education at the Freie Universität Berlin. Eighteen students were allowed to choose this elective workshop as opportunity out of a selection of clinical courses from all veterinary fields. The workshop was conducted by 2 instructors in 2 consecutive modules.

The first module was performed at seven 2 hr appointments on a weekly basis. Students were assigned to one of 5 different working groups depending on their personal interest. Working groups were defined by their anatomic structure and importance for the obstetrical process as (1) uterus, cervix and vagina, (2) the pelvis, (3) the external genital organs, (4) the outer framework, and (5) the calf. The first exercise for each group was to discuss the physiology ofthe functional structure during parturition and to define specific characteristics of the functional structures in the context of obstetrical procedures. Results of each group were presented and discussed among all students. The second exercise for each group was to determine and define specific physiological characteristics of each functional structure that needed to be implemented in the obstetrical model and to make a list of required materials that could simulate those functional structures in the obstetrical model. General requirements to the obstetrical model were availability and longevity of all materials as well as easy cleaning and disinfection of all parts. Furthermore, the budget for all required materials was

limited to 200 . The functional structures were constructed in each working group and combined to the obstetrical model at the last appointment.

The second module was performed as an intensive course in a total of 7 hours on 2 consecutive days. This module was provided to the students to acquire practical experience in practicing with the constructed obstetrical model and to reflect their learning process during this workshop. All students had the chance to perform at least 2 simulated cases consisting of exploration and corrections of fetal dislocations with the obstetrical model. At the end of this workshop all students were invited to comment their learning experience during this workshop and to discuss the pros and cons of the construction of such a model as an interactive training method.

Students of group 1 defined the constriction and flexibility of the cervix as the main criterion to provide an authentic feel of the birth canal. Furthermore the application of lubricant and obstetrical instruments should be enabled to provide practical support. Group 2 defined the angulation and the maximum width of the pelvis as critical for the obstetrical procedure. Group 3 defined constriction and flexibility of the external genital organs as most important. Furthermore the full extraction of the fetus and the use of a commercially available calf puller should be possible. Group 4 defined the mobility and angulation of the extremities of the calf as most important factor for the simulation of fetal dislocations. Furthermore a defined structure of the fetal head was perceived necessary in order to apply eye hooks and other obstetrical instruments. The weight of the calf model should correspond to the weight of a newly born calf for the simulation of balance of forces during obstetrical procedures. Group 5 defined the working height and position (lying vs standing) of the cow as most important factor for obstetrical procedures. The obstetrical model should provide simulation of an upright position of the cow for manual exploration and corrections of fetal dislocations and a lying position for the extraction of the calf.

The vagina, cervix and uterus were constructed as one unit out of a flexible rubber tissue padded by a neoprene layer to simulate constriction and flexibility of the birth canal. A bone preparation of a bovine pelvis was used as a pelvis. The upper and lower part of the pelvis were replaced by an elastic rubber tissue to provide the simulation of different pelvic diameters. The external genital organs were modelled out of medical latex to provide flexibility and the possibility for a full extraction of the fetus. To provide the use of a calf puller the muscles of the hind legs were simulated by rubber tires. Group 4 concluded that the construction of a model calf that would meet the requirements identified was not possible within the scope of this workshop. Therefore the utilization of calves born dead was selected as best alternative to meet all requirements defined before. The outer frameworks was constructed out of a table and a plastic barrel that were adjustable in position for simulation of the cow position.

At the end of the second module all students described their learning experience during this workshop and discussed the pros and cons of the construction of a bovine obstetrical model as an interactive training method. All students described their learning experience during this workshop as a valuable and intense experience. The initial planning and coordination for the construction of the obstetrical model required a lot of time and intense discussions within the students. Nevertheless, the effort spent on the preparation enabled the students to perform a profound analysis about the physiology of bovine parturition and obstetrics. All constructions in this project were conducted by students so a general statement about the durability and quality of the bovine obstetric model is not possible at this time. However, reconstruction or replacement of broken parts can be applied whenever needed and easily due to ample availability and low cost of all materials utilized. Therefore, refinement and/or the constructions of a next generation model should be encouraged by providing the construction plan of the initial model. Additional benefits of the bovine obstetrical model described by the students are the full extraction of the calf and the possibility to perform extraction in a simulated lying position of the cow. Furthermore the obstetrical model enables the application of lubricant and the utilization of a wide range of obstetrical instruments (e.g. calf puller) compared to conventional obstetrical models.

The objective of this project was, to develop and construct a model for the interactive teaching of bovine dystocia during an elective course on bovine obstetrics for veterinary students. Within the scope of this project an obstetrical model was constructed by a group of veterinary students that provided an authentic feel of the bovine birth canal and the opportunity for the full extraction of the fetus. Furthermore, the application of lubricants and a wide range of obstetrical instruments was enabled. All students described their learning experience as highly valuable and intense. Further projects should provide construction plans of teaching models to enable reconstruction and later refinements for all interested students.

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Validation of a bovine vascular access model for teaching students a technique for placing catheter in the auricular vein of cattle

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Day-one-skills and competences have been introduced by the European Association of Establishments for Veterinary Education (EAEVE) in 2008. These include how to perform first aid as well as administrating appropriate treatment [1]. For

parenteral administration of drugs and fluids e g. in case of dehydration, intravenous (IV) drip infusion through catheter placement is a well-established procedure. In cattle catheterization of the auricular vein guarantees a safe fit and can be used over several days even to infuse larger amounts of fluids [2]. A bovine model for catheter placement into the auricular vein has been constructed at the University of Veterinary Medicine Hannover (Figure 1). After evaluation by experts and students the model has been rated as useful for teaching [3].

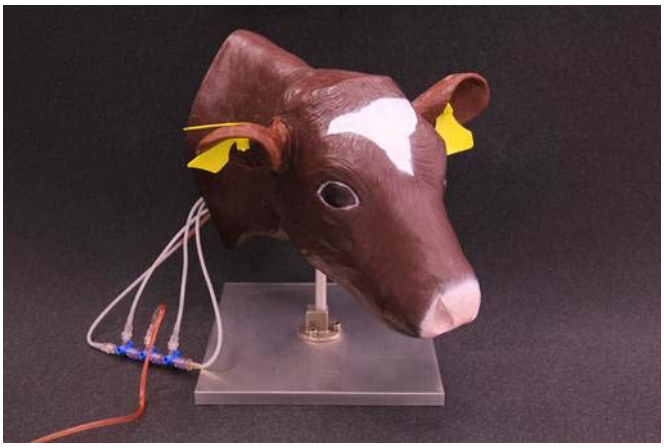

Figure 1: Bovine vascular access model for placing catheter in the auricular vein of calves

Aim of this study was to test whether students with a training-session on the model perform catheter placement into the auricular vein of cattle successfully and correct. Furthermore student's opinion on the model in comparison to live animal was collected.

During the last year of study, 13 students with no hands on experience in catheter placement in cattle were taught catheterization on the model. Afterwards all students underwent a checklist-based assessment (nine binary items) on live animals using an objective structured clinical examination (OSCE). Every student was allowed to perform two attempts, if needed. After the assessment students were asked to rate the model with a questionnaire. Questions focused on overall looks, haptic features and use of the model for teaching purposes. Rating was given on a Likert-Scale from one to four, "1 = fully agree", "2 = agree", "3 = mostly agree" and "4 = don't agree".

A total of nine students (69 %) succeeded in placing the catheter, seven students performed all checklist items correct and two students scored 89 % of all items. Four students did not manage to place the catheter. Only two students succeeded on their first attempt.

Students rated the overall look of the simulator 2.27, the haptic features 2.73 and the use for teaching 1.83

Overall the model seems to be able to demonstrate essential characteristics of catheter placement into the auricular vein in cattle. Furthermore, simulator-based training helped students to perform catheter placement successfully. In the future, the use of the model under different conditions as well as different delivery approaches on the effect of student's performance will be of interest.

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A sheath scrape model attached to a multifunctional life size Breeding Soundness Examination (BSE) bull

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The diagnosis of bovine venereal diseases is an important skill required of any rural or large animal veterinary practitioner in Southern Africa. All newly graduated veterinarians as well as veterinary nurses must be able to perform a sheath scrape. The procedure is slightly invasive but fairly simple and can be taught well on a veterinary model. Once the idea for the sheath scrape model was developed, it was decided to attach it to a life size BSE bull. An existing taxidermy mould was used to manufacture a "Brahman" bull made of fiberglass with a gel coating. The skin from a bovine carcass was preserved. The scrotal contents (testes and epididymides), penis and accessory sex glands were used to make moulds of

these organs. The moulds were then used to cast silicone models of the organs. Further parts used to construct the bull model included a dragon skin perineum, a pilates ball ("rumen"), rubber tubing ("oesophagus"), pool pipes ("trachea") and silicone injection pads. Cleaned anatomical specimens of the pelvis, sacrum and tail vertebrae were also added to the model. Skills that can be taught on the bull include most of the procedures done during a BSE, i.e. rectal palpation to assess the accessory sex glands, palpation of the sheath and its contents, palpation of scrotal contents (interchangeable normal and abnormal testes, epididymides and spermatic cords), measurement of scrotal circumference, palpation of the penile sigmoid flexure, evaluation of sheath confirmation as well as the sheath wash and scrape procedure. Additional features are the passing of a stomach tube into the "rumen", with the possibility of rumen auscultation to ensure correct placement of the stomach tube, intravenous and intramuscular injection sites and an epidural anaesthesia function, where correct needle placement is confirmed by a light coming on.

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Can virtual reality enhance academic success while learning about the canine stifle joint?

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Visual-spatial ability in veterinary students has been shown to be a key skill necessary for educational success and long-term knowledge. Research has shown that students who employed a multitude of study methods over a single study method had greater academic success and a deeper processing of material. Yet, most veterinary curricula provide only lectures including two-dimensional images along with a limited number of hands-on laboratories. Advancements in technology have presented veterinary educators with the opportunity to create additional and improved tools for the study of the animal body. The ability for a student to mentally manipulate an image as if it were three-dimensional (3D) is essential for good clinical and surgical practice of medicine. The purpose of this study was to create a 3D model of the stifle joint and create an interactive clinical case web tool. In addition, we aimed to evaluate students' anatomical proficiency once the 3D virtual model was used in association with the interactive clinical case.

Methods – A 3D virtual model of the canine stifle joint was created. Thirty senior students undergoing an elective orthopedic surgery rotation were recruited. Students were randomly assigned to one of these two groups: control group (students had access to the routine educational tools, including text books and lecture notes) simulation group (in addition to the routine educational tools mentioned, students had full access to the simulation model and the clinical case). All students were given a questionnaire to evaluate their previous orthopedic experience and 2 quizzes, one at the beginning of their two-week rotation and another one at the end of their rotation. Data from the questionnaire and quizzes is still being collected and evaluated.

We expect to find a significant difference in academic success and knowledge retention between the students who were provided with the supplemental 3D stifle model and clinical case web tool compared to those students who did not have access to the model.

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A new approach in anatomical teaching – Upgrading the conventional practical learning by immediate combination with modern digital teaching

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The gross anatomy has always been one of the significant cornerstones of veterinary education. A detailed anatomical knowledge is fundamental for the correct interpretation of clinical imaging and the proper implementation of medical interventions. This also applies to the skeletal system of domestic mammals. The precise knowledge of numerous osseous structures, their topography and definition with technical terms, and their functional and clinical relevance are the basis for understanding the entire musculoskeletal system.

Education is becoming exacerbated due to the constantly rising number of students and the expanding curriculum. The simultaneous decrease in both the number of lessons and teaching staff interferes with comprehensive teaching. Thus, the theoretical training based on books, atlases, lectures and digital learning media predominates. Practical training shifts unfavorably to the background. The majority of the students has particular difficulty in transferring the theory to the real anatomical specimen. Moreover, the correct pronunciation of the technical terminology is especially difficult for beginners.

A reasonable approach to improve the practical education and develop practical combines real anatomical specimens with theoretical digital content. This pathway has been chosen in this project.

In order to implement the new teaching concept, the tracking system from the simulator SonoSim III of Sonofit GmbH (Darmstadt, Germany) was used. The bones of canine and equine thoracic limbs were chosen as an example of an anatomical system. Additionally, audio-, text-, image- and video-files of anatomical specimens, conventional radiographs and CT-scans were integrated into the simulator.

In the case presented, the thoracic limb skeleton of dog and horse was developed with the use of SonoSim III, a novel instrument for autodidactic acquisition of the gross anatomy. When touching the bony structures of a real anatomical specimen with a special pen, suitable explanatory audio and text files will be played or displayed on a monitor. This allows the students to learn the topography independently and autodidactically and to label the osseous structures with the technical terms. Moreover, this system provides the more interested user with additional anatomical and clinical information by showing radiographs of the respective bony structures. This innovative system will support and improve the gross anatomical education as well as encourage the understanding of clinical imaging. The new recently developed learning tool will be used and evaluated in the upcoming semester 2015/16 by the veterinary medicine students of the first semester at the Ludwig-Maximilians-University, Munich.

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Virtual 3D veterinary anatomy: Interactive learning modules

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Especially first years students of the veterinary medicine are faced with learning enormous amounts of anatomical information in a very short period of time. The available time spent in anatomical labs is limited, therefore it is inevitable to recapitulate anatomical issues at home. However, exceedingly few students have any anatomical specimen to practice on.

Up to now, home study manly is based on learning anatomical issues from 2D drawings or photographs found in textbooks. The idea is to provide realistic 3D-dimensional models of different regions of the animal body based on CT Scans for the use at home. Additionally, by embedding these models into learning modules with predefined questions and answer possibilities in form of single choice, multiple choice and matching tests, students are guided through the enormous amount of anatomical information given in the textbooks.

High resolution CT scans of skulls and bones are generated. Based on the different gray scales, every picture point is assigned to a material and subsequently 3D models are created. Close attention is paid to generate most realistic and detailed anatomical 3D-models. Important anatomical structures are highlighted. To enable easy access for everyone, the models are transformed into PDFs. By integrating these 3D-PDFs into learning modules, students are challenged to acquire distinct anatomical knowledge by careful inspection of the 3D-models.

Detailed and realistic 3D-models of different anatomical issues are generated and embedded into learning modules, which are based on self directed questions and answer. The multiple choice test based self-assessment in combination with 3D-

models with highlighted anatomical structures enable the students to learn the anatomical issues more focused and promotes the three-dimensional imagination abilities.

By creating learning modules with embedded 3D-models and by evaluating the knowledge students have acquired using single choice, multiple choice and matching tests, the gap between learning sessions within the anatomical labs and the self directed learning at home can be bridged.

However, a very elaborate procedure is needed to create realistic and detailed anatomical 3D-models.

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41

Student's perception about harmful use of animals in Veterinary Education in Brazil

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Brazil currently ranks first in the world in number of veterinary schools, currently has 183 cursos1 There is no official data on how animals are used in veterinary medicine education, how many are killed for this purpose, how many go through harmful procedures that affected their physiological and psychological welfare and what colleges are already using humane methods in veterinary and life science courses.

Similarly, there is not any wide-ranging study that demonstrates the opinion of the veterinary students about this important issue that permeates the daily lives of tens of academic courses.

In an on-going study, an online questionnaire (with 26 semi opened questions) was applied to 1383 students of veterinary medicine from 27 states of Brazil, and it can be demonstrated up to the present time, most of these respondents understand some important and relevant concepts regarding use of animals in Veterinary Education.

Most (45.3%) of respondents, that was asked if they know about the concept of the 3Rs (replace, reduce and refine) regarding the use of animals in teaching and research", said "Yes" and 12.6% answered, "They know in part".

In another question, 84.7% answered they mean by "harmful use" of animals in teaching, - "Euthanasia of healthy animals for a demonstration classes" and in the second place (82.8%) - "An invasive procedure (surgery, suture, endotracheal intubation, etc.) in a healthy animal, which does not need such a procedure".

When they were asked about - Which would be the main ADVANTAGES of the use of "substitutive methods" when compared to the harmful use of animals in the Vet school? Most respondents (88.6%), answered that the main advantage is "To be a method ethically acceptable, where there is no cruelty to animals."

In another question, about the IMPORTANCE of adopting humane & substitutive methods and no longer use live animals in a harmful way in the undergraduate education, 73% of respondents said "Yes, they should adopt substitutive methods because as veterinarians have the ethical and professional obligation to ensure welfare and respect animals", showing that for these students there is a moral obligation of vet professional regarding animals.

Although the study is not yet complete, with these preliminary data we can say that this sample of students show us to be familiar with concepts of harmful use of animals, substitutive methods and 3Rs, and they believe that Veterinary colleges should adopt such humane methods as an ethical obligation.

As in most of the times, the driving force for changes in traditional teaching methods are the students1, know about these issues is a very important tool for students around the world, demonstrating the importance of discussing this issue with this population.

Figure 1

Figure 2

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Meeting point of animal welfare and veterinary education or else. The difficulties of the clinician in the ocean of students and animals.

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The Faculty of Veterinary Science, Budapest is, the only veterinary school in Hungary. Current enrolment is about 100 and 120 students for the Hungarian and English programs, respectively. This means that we have a total of 800 students at the veterinary school from which, each year 400–450 students step into clinical practice, obligatory at the small animal clinic. Obligatory clinical shifts cross over the consecutive last four semesters, which are destined for the increase manual skills of students.

On the other hand, although the number of inhabitants of Hungary is narrowly more than 9.8 million, the percentage of dog and/or cat-keeping households is more than 40% in contrast with the 20–30 % European average. The estimated number of stray dogs is more than 200 thousands from the total of 2.5 million dogs and only 1.5 million are registered in the official database despite of rules. In spite of a high number of successful placement to new owners and euthanasia (unfortunately), the stray dog number does not decrease from year to year. The only explanation is their reproduction.

The faculty was looking for possibilities to provide practice for students, the shelters were looking for possibility of spaying stray dogs. The university offers spaying, and the shelters provide the dogs. And the government covers the half of the expenses.

Three to five students form a group and the shift lasts from Monday until Friday. Although until this time students had passed the collective practices in groups and they have become familiar with the theory of placing intravenous catheters, disinfection for operation, rules of sterility, and anatomy of reproductive organs, but this is the first direct contact with anaesthesia, opening of abdominal cavity of a breathing animal. From the start, there were 914 dogs operated by the students on 159 operation days. The four supervisors work in daily relay with each other and discuss the students' progress daily with each other, controlling their development individually. This means statistically, that the activity of one supervisor increases the practical skills of 100–112 students, and results in 229 spayed animals.

According to experiences, it can be concluded that high level of theoretical education does not substitute practice. The adjustment of the operation mask, avoiding to touch non-sterile objects with sterile operation gloves, need some automatism of reflexes. The first contact with the feeling of responsibility for a living being effects students in different ways. Observed reactions vary from inspiration through depression to confusion. One of the most important role of the supervisor is to help to focus student's attention on important points and teach how to make decisions and considerations.

The management of the student operations needs new skills from the supervisors, too. Reflect to the actions in pre- and post-operative rooms, and management of the operation, all these postulate the ability of shared attention from supervisor and well-trained technicians.

Although the risk of hidden diseases and sensitivities is high due to unknown anamneses, there were only two lost from the 914 patients.

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Workshop Session 1

Setting up an OSCE
(Sarah Baillie, Alison Catterall)

In the workshop we will share our experiences running OSCEs for animal handling, clinical skills and communication skills. The workshop will cover the whole process from the initial planning, to preparing and running an OSCE, through to analysis of the results. We will provide practical tips for resourcing the examinations, managing a circuit and training staff.

Teaching Surgical Skills in Large Animals
(Dean Hendrickson)

This workshop will provide the attendee to hear about some of the various methods that are being used to teach surgical skill in large animals. The attendees will also be asked to participate in a forum to discuss the best way to teach surgical skills in large animal patients. A couple of examples will be provided for the attendees to participate in large animal surgical skills.

"Students in educational research projects" – how to turn students from consumers to creators
(Renate Weller)

Active involvement in research promotes the development of a whole range of generic as well as research specific skills. In this inter-active workshop we will explore how we can engage students in the research process by getting them involved in paedagogical research. We will discuss "tips and tricks" on how to get the most out of these project in terms of student and supervisor satisfaction, publications and teaching material (e.g. simulators) and of course student (and supervisor) continuing development.

Development and Fabrication Process for Practical Simulation Model
(Russ Gray, Bryan Pfahl)

Description of entire fabrication process of a specific practical simulation model, including research, initial sculpture, molding, casting, prototypes and testing.

Promoting effective student feedback
(Sheena Warman)

This interactive workshop will give participants an opportunity to consider the importance of effective feedback for student learning. There will be discussion of the potential challenges of feedback, particularly within the clinical environment, and participants will be encouraged to try out some simple frameworks for facilitating feedback dialogue with students. Approaches to enhancing the feedback culture within institutions will be considered.

Workshop Session 2

Simulated clients: Enhance communication teaching and leraning through in the moment coaching and feedback

(Elpida Artemiou, Beth Dronson)

Clinical communication is a Day One competency, and training in communication skills using simulated clients in small-group experiential sessions facilitated with attention to effective skills in coaching and delivery of constructive feedback is essential. Using the premises of the Calgary-Cambridge Guide, participants will practice effective approaches in providing feedback as well as explore challenges and opportunities in the delivery of communication skills training. In small groups, participants will practice communication teaching and coaching skills through vignettes and live simulations as well as engage in discussions on how best to support student, faculty and clinician learning experiences in educational and practice settings.

The ethics of educational research

(Carol Gray)

We will look at the main ethical concerns involved in educational research. We will apply these to several (anonymised) real-life applications for research ethics approval and review these as a group.

Skills education in the veterinary curriculum; how to assess we get value for money?

(Claudia Wolschrijn)

Recently, new skills labs have been designed and opened at a number of vet schools. Most of them are centralized labs, to which the students come and register before practicing the skills. In the NL, we chose to have a decentralized skills lab; every clinical department is responsible for its own skills education and has space allocated for practice. As such, skills like animal handling, tying knots, basic laboratory exercises, but also cadaver surgery are all located in a designated area. For logistic reasons, the basic skills (obliged for every –Bachelor- student) are available at the farm animal department. All the species-specific skills are taught at the respective department. The advantage of such an approach is that the skills lab is always nearby, making it possible to have reinforcement of the skills during the clinical rotations.
How do we know this works? Are student evaluations enough? What value have the marks the students score during training and in their clinical rotations? In our experience, validation of skills lab teaching is difficult and hard to publish. Individual devices need a gold standard and the testing of five validities, but is it possible or even better to validate the lab as a whole?
In this workshop we want to exchange best practices among the members on how to run a skills lab and how to validate the use of it.

Developing and maintaining clinical skills learning environments and student resources

(Robin Farrell Linda Shell)

This workshop is intended for those interested in developing skills and sharing ideas on how best to set up a clinical skills teaching and learning environment. The workshop will focus on the more intricate details of planning an individual laboratory from how the room should be set up to what types of resources (e-learning materials, videos, models and consumable items) should be available to the students based on their level of competency in any one particular skill or procedure.

Challenges and tips for success will be highlighted in hopes of easing the implementation process of building or growing a clinical skills program. The information provided will be drawn from the literature and our colleague's experiences.

Clinical skills laboratories vary considerably when it comes to size and funding. This workshop aims to provide information that can be applied to any budget from the small inexpensive learning space to the grandiose program design. The facilitators will introduce each step of the laboratory and budget planning process followed by small group work. Participants will have an opportunity to create a laboratory plan and work together to find solutions to common problems encountered.

“How to create your own virtual patient” Part 1
(Christin Kleinsorgen)

Previous studies confirm the use of e-learning and virtual patients as efficient and auspiciously demonstrate better retention of knowledge.
In our first session we will start with a short introduction to virtual patients and their use and implementation at the TiHo.
Then the case-based learning system CASUS® will be presented in the second half. You will get familiar with the player’s and authoring mode.
Aim of this Workshop is to create your own virtual patient in a small group, and present it at the end of the Workshop.
Therefore be prepared with data of one of your favourite example cases (we will provide substitutes if necessary).

“Strategies and Tools for flipping Content and Encouraging Critical Thinking”
(Duncan Ferguson)

Critical thinking and problem-solving, individually and in teams, are key activity of a veterinarian’s job. However, the educational process in the pre-clinical training years is focused largely on the virtually impossible task to “deliver,” largely through lectures, complex medical content, with little practice at these crucial processes. The challenge for the instructor is to spend more time with the student while they consolidate their understanding through the application of the content. Today’s digital technologies offer potential solutions in what has become known as “flipping” or “inverting” the content into digital formats which students are asked to review before face-to-face instructional time is spent on application of the information. Self-paced customized learning approaches also become more feasible. Such blended instruction has been shown to result in enhanced longterm learning. This workshop will focus on several strategies and available low-cost instructional tools for reconfiguring instruction that would enhance classroom time for a focus on interactivity and critical thinking. Techniques for developing low-cost short instructional videos, portable and customizable module platforms such as the one available on TED Ed (http://www.ed.ted.com) and problem/case platforms which enhance higher level critical thinking will be emphasized in the workshop. The goal will be for each participant to gain practice developing elements of such a learning module.

Workshop Session 3

Clinical Skills Model Buffett and Tours to the Clinical Skills Lab
(Marc Dilly, Rikke Langenbæk)

This workshop is suitable for conference attendees who would like to try multiple clinical skills teaching models developed at the University of Copenhagen and University of Veterinary Medicine Hannover.
Participants will be encouraged to test and construct some models/simulators. Feel free to bring your ideas, construction plans or even models with you. Furthermore, participants will experience a wide range of teaching models and have the opportunity to pick up plans for construction.

Introduction to Games Based Learning, The Layered Learning Model and Game Development
(Eric Bauman, Dave Pederson)

Educational games are becoming ubiquitous within medical education and other types of clinical training programs. Students enjoy games and to some extent expect them to be a part of their learning experience. (Snider, 2003; Thuma, 2012; Wecker,2012). Games themselves by there very nature provide both an evaluative and summative experience for teachers and students. They provide immediate and justintime feedback through a series of rules and consequences (Bauman 2012). Games evaluate player, learner success through performance (SQUIRE, 2006). Performance evaluation is a familiar and contextually relevant premise found through out medical education (Bauman and RalstonBerg, 2014; Bauman and Games, 2011;

Games and Bauman, 2011). This workshop will provide participants with an overview of gamebased learning situated from the perspective of medical education using the layered learning model. this workshop will conclude with a faculty facilitated interactive game development exercise using a narrative storyboarding technique.

Optimising Small Group Teaching
(Catriona Bell)

Learning Objectives:

By the end of this workshops you should be able to :

1. Explain the purpose of using an icebreaker at the start of small group teaching sessions (SGTS)
2. List techniques that may help to encourage individual contributions from students during SGTS
3. Select the most appropriate room layout for SGTS
4. Adapt questioning techniques during SGTS
5. Identify appropriate strategies for dealing with difficult students during SGTS
6. Share 'top tips' for optimising student learning during SGTS

Creating a simulation case under aspects of realism and cost
(Katja Anne Dannenberg, Fabian Stroben)

Simulation is an essential part of training for clinical practice and an opportunity to apply clinical skills in realistic settings both in human and veterinary medicine. Simulation is well known to increase the feeling of preparedness, can effect behavourial changes and is linked to a higher level of performance in medical students.
In this workshop design features of a “good” simulation case will be developed using an example case and small group work. Discussions will focus on aspects of realism and cost-effectiveness: How much realism is needed to achieve learning-benefits and how can I develop full-scale simulation with limited means?
Throughout the workshop examples of the emergency room simulation “Nachtdienst: Bist du bereit?!” (Nightshift: Are you ready?!) will be introduced, which is organized by student tutors of the Lernzentrum, skills lab of the Charité-Universitätsmedizin Berlin.
This workshop addresses junior-educators with little experience in facilitating simulation for both human and veterinary medicine. Learning goals of this workshop are not specific for any discipline.

“How to create your own virtual patient” Part 2
(Christin Kleinsorgen)

“Cultivating a Growth Mindset: Enhancing Receptivity to Feedback”
(Jane Shaw)

As educators, we often teach colleagues or students approaches to “giving feedback”. This workshop focuses on techniques for “receiving feedback”. Providing and receiving feedback is one of the key competencies for personal and professional development. Barriers to receiving feedback include: temperament (50%), interpretation (40%) and circumstances (10%). There is a 3000 percent variability in emotional responses between individuals who respond to feedback with catastrophic thinking to those who are unable to hear the feedback at all. There is potential in the 40% window of interpretation to turn upsetting feedback into learning. This workshop will present concrete strategies for enhancing receptivity to feedback in colleagues and students.

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(Referring to abstract numbers)

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